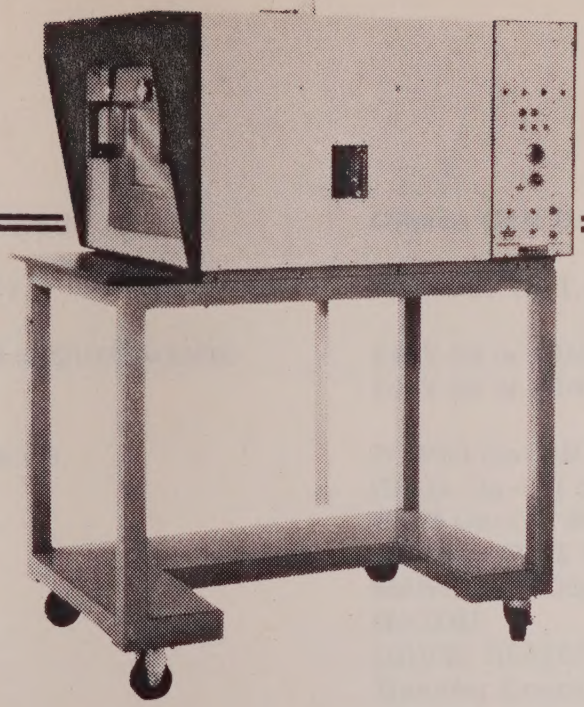
INSTRUCTION MANUAL
Model No. 8071

NEW.
42035-1



DELTA DESIGN INC.

SUPERCHARGER

Specifications

STORAGE CAPACITY	72 IC Devices In Carriers
TEST VOLUME (H x W x D)	12-1/2" x 21-3/4" x 17-1/4" (31.75 x 55.25 x 43.82 Cm) 4,700 cu. in. (77.02 l)
AIR CIRCULATION	Two 140 CFM Centrifugal Blowers With Baffling To Provide Equal Distribution roughout The Chamber. The Air Flow In A Vertical Pattern.
OUTSIDE CASE DIMENSIONS (H x W x D)	21" x 40-3/8" x 30-1/4" (53.34 x 102.55 x 76.85
INNER LINER	Type 302 Stainless Steel
OUTER CASE	Aluminum

GE Electronic Services - Los Angeles
M14364X

MP MASTER
MA32441

ENVIRONMENTAL CONTROL EQUIPMENT FOR RESEARCH AND INDUSTRY
5725 KEARNY VILLA ROAD • SAN DIEGO, CALIFORNIA 92112

Digitized by the Internet Archive
in 2025

https://archive.org/details/manualsplus_06967

INSULATION	Closed Cell Urethane Foam
WEIGHT	400 Lbs. (Net.) (181.44Kg)
POWER REQUIREMENTS	240V 50 or 60Hz Single Phase AC or 208V 50 or 60Hz Single Phase
CONTROLS	POWER On-Off Switch and Light COOL On-Off Switch and Light HEAT On-Off Switch and Light TEMPERATURE SET Control MANUAL/PROGRAM/1-4 Control Switch (MODE) CHUTE HEATER On-Off Switch Transfer Control Switch: REMOTE/OUT/IN DELTA LOOP RESET Button GUARD/BY-PASS Switch RESET Button (Delta Guard) SOUND/SILENCE Switch
HEATING ELEMENTS	Four 17.5 Ohm Elements, Total of 3,280 Watts
COOLING	Liquid Nitrogen (LN_2)
PROGRAMMING	Programmable
TEMPERATURE RANGE	-65°C To +150°C
RESETTABILITY	$\pm$0.25°C
TEMPERATURE DEVIATION	$\pm$0.1°C
LINE VOLTAGE STABILIZATION	$\pm$0.25°C For 105 To 125 VAC, 50 or 60Hz Line Voltage Change

NOTE

IT IS RECOMMENDED THAT THIS MANUAL BE READ THOROUGHLY BEFORE CONNECTING EQUIPMENT TO ELECTRICAL POWER SOURCE.

INTRODUCTION

The Delta Design, Inc., Model 8071 SUPERCHARGER is a cart mounted test chamber embodying a mechanized system capable of handling up to 3,000 devices at room temperature in the type 029 (or equivalent) carriers per hour. Devices are tested in a continuously thermally controlled and monitored environment. A storage drum feature of the mechanism retains 72 devices in the test environment. As the drum is indexed 20° of its rotation, four devices are stored in each of eighteen slots. Simultaneously, 340° from the load station the eighteenth slot is positioned to present in turn each of its four devices to the contactor for testing. Rotation time of the drum from input point to output point provides maximum soak time per test cycle.

Present temperatures (4) to customers' requirements are a feature of the Model 8071 SUPERCHARGER that meets the need for precise setting of repeat temperature requirements. Required temperature setting may be set by Delta technicians before shipment of the Charger, or later by customer's trained personnel.

Adaptability to high frequency electronics performance packages of all IC testers was anticipated in the layout of the handling mechanism within the chamber. Delta Design contactor assemblies are interfaced to the electronics package in such a manner as to permit fast interchange of performance boards and/or contactors.

The input magazine provided is designed to be compatible with the output magazine of the previous testing stages.

CONTENTS

	Page
SPECIFICATIONS	i
INTRODUCTION	iii
ILLUSTRATIONS	vi
1 CHAMBER AND CONTROLLER DESCRIPTION	1
1.1 Chamber	1
1.2 Solid State Controller	1
1.3 Pyrometer -Failsafe	2
2 PRINCIPLE OF CHARGER MECHANICAL OPERATION	2
2.1 Description	2
2.2 The Delta Loop	4
2.3 The DELTAGUARD	4
3 INITIAL SETUP	4
3.1 Uncrating	4
3.2 Lubrication	4
3.3 Electrical Connection	5
3.4 Air Connection	5
3.5 Liquid Nitrogen Connection	5
3.6 Alignment	6
4 STARTING UP PROCEDURE	7
4.1 Precautions	7
4.2 Controls	8
4.3 Maxi-Timer Adjustment	11
4.4 FAILSAFE Adjustment	11
4.5 Dry Nitrogen System	12
5 LOADING THE CHARGER	12
5.1 Magazine Loading	12
5.2 Hand Loading	13
5.3 Input Chute	13
5.4 Output Chute	13
5.5 Test Contactor Installation	13
6 MAINTENANCE	14
6.1 Controller Calibration Procedure	14
6.2 Pneumatic System	14
6.3 Removal of IC Carrier Handling Mechanism	15
6.4 Adjustment of Index Ring and IC Carrier Drum	16
6.5 Adjustment of the Actuator Stroke	16
6.6 120V Transformer	17

		Page
7	TROUBLE SHOOTING	17
	7.1 The Controller	18
	7.2 The Delta Loop	18
	Trouble Shooting - Mechanical	19
	Trouble Shooting - Electrical	20
8	SETTING THE DIAL TEMPERATURE INDICATOR	21
	8.1 Description	21
9	WARRANTY	22

ILLUSTRATIONS

Figure		Page
1	Major Component Location	23
2	Temperature Control System	24
3	Actuator Mechanism	25
4	Back Panel	25
5	Controls/Contactor - Seal Assembly /Input Chute Removal	26
6	Chamber (view from R.H. side with door open)	27
7	Hand Loader in Place of the Delta Magazine	28
8	Output Chute	28
9	Loading the Carrier (TO-5) into the Magazine	29
10	Loading theCarrier (DIP) into the Magazine	29
11	Input Chute Assembly	30
12	Output Chute Assembly	30
13	Preparing th Remove the Handling Mechanism	31
14	Removing the Handling Mechanism	31
15	Adjustment of the Index Ring and Drum	32
16	Application of Index Ring Wrench (P/N 4200004)	32
17	Carrier Handling Mechanism-Illustrated Parts Breakdown	33
18	Detail "A" of Carrier Handling Mechanism-Illustrated Parts Breakdown	34
19	Torque Tube Assembly	34
	Replaceable Parts List-Carrier Handling Mechanism	35
20	Schematic-Supercharger Model 8071 (D1635102) with parts list	36-37
21	Parts Layout-P.C. Board Assembly (1137C-3M)	38
22	Schematic-Type III P.C. Board (1137D-3)	39
23	DeltaGuard P.C. Board Schematic	40
24	Assembly Sheet-Maxi-Timer (B2634031) with parts list	41-42
25	Schematic-Maxi-Timer (B1634031)	43
26	Assembly Sheet-Delta Loop (C2634032) with parts list	44-45
27	Schematic-Delta Loop (C1634032)	46
28	Block Diagram- Delta Loop (C1634128)	47
29	Assembly Sheet-Output Sensor (B2634184) with parts list	48-49

30	Schematic-Output Sensor (B1634184)	50
31	Signal Phase Relationship-Delta Loop to Automatic Handling Equipment	51
32	Assembly Sheet-Photo Detector Buffer Board (A2634785) with parts list	52-53
33	Schematic-Photo Detector Buffer Board (A1634783)	54
	Mini Air Line Filters	55
	Mini Air Line Lubricators	56
	Mini Air Line Regulators	57

1 CHAMBER AND CONTROLLER DESCRIPTION

1.1 Chamber

1.1.1 The chamber is a precision environmental temperature test chamber having a stainless steel interior, aluminum outer case and urethane insulation. The air circulation is closed and provided by 140 CFM blowers.

1.1.2 The chamber is heated by applying full wave power to bobbin wound nichrome heating elements via the HEAT solid state switch.

1.1.3 The chamber is cooled by injecting liquid nitrogen into the air stream through an expansion nozzle. The coolant flow is metered by a solenoid valve, controlled by the COOL solid state switch.

1.1.4 The temperature control system is shown in block diagram form in Figure 2.

1.2 Solid State Controller

1.2.1 The controller compares the resistance of the temperature probe to the resistance of the indicated SET POINT on the TEMPERATURE SET dial potentiometer or the digital resistance selection of the optional Digitemp controller. The resistance of a remote programming resistor is compared to the probe resistance of the MODE switch in the PROGRAM position.

1.2.2 The resistance of the probe will be either less than, equal to, or greater than the resistance of the TEMPERATURE SET potentiometer (or the DIGITEMP), i.e., program resistance. These three situations directly correspond to the chamber temperature being lower than, equal to, or higher than desired. The controller applies heat, coolant, or withholds both to obtain and maintain the selected temperature in the chamber.

1.2.3 Mode - The controller is a three mode unit, i.e.:

a. Heat only.
b. No heat or coolant.
c. Coolant only.

Ths mode of control ensures that LN_2 coolant is not wasted in a continuous cycling of the heaters and coolant valves such as would be the case for a simple two mode output controller.

1.2.4 Null Detector Circuit - A contact closure is provided at the rear which functions when the chamber reaches the indicated SET POINT of the controller. This contact closure may be used to signal external equipment that the chamber has reached selected temperature. Terminals are provided at this location (Figure 4-10). (NOTE: Reference to parts or adjustments in this manual will be keyed to the illustration which shows it best, i.e., in ths instance the illustration is Figure 4 and the part is 10. The same part may bear a different identifying number in another illustration.)

1.3 Pyrometer - Failsafe - The temperature in the workspace can be continuously monitored by the Pyrometer (optional equipment). When the temperature in the chamber reaches either the HI or LO LIMIT set point, power to the heater or coolant circuits is interrupted and the FAILSAFE lamp lights. Heater or coolant power can be restored only by manually operating the RESET button. (Figure 5-11)

2 PRINCIPLE OF CHARGER MECHANICAL OPERATION

2.1 Description

2.1.1 IC carriers are hand or magazine loaded into the input chute by inserting the hand loader or magazine over the bayonet fittings on the input chute. Once the magazine is located, the retaining clip at its lower end is caused to be withdrawn and the IC carriers are dispensed into the input chute.

2.1.2 The input chute is composed of three sections: the upper section containing the electrical heating units; the middle section which is a short length of glass epoxy serving as a thermal barrier; and the short lower section functioning as a sliding joint with the Charger IC carrier handling mechanism assembly.

2.1.3 Below the input chute is the intermediate chute which is a short section acting as a socket for the input chute to line up with, and is

located just above one of the chutes in the parts storage drum.

2.1.4 The parts storage drum has a capacity for storing 72 IC carriers in 18 vertical chutes -4 carriers per chute. Parts are loaded into each chute four at a time, as the drum indexes through 20 degrees of rotation, after every fourth test operation.

2.1.5 After the drum has indexed 18 times, the parts will be in a position directly over the transfer block. The lowest of the four vertically stacked parts will drop into the top half of the transfer block. As the transfer block moves forward towards the test contactor, the part drops into the lower half of the transfer block where it is presented in precise alignment to the test contactor. When a TO-5 device is being tested, a reseating mechanism incorporated in the transfer block ensures that the device is properly seated in the carrier. As the test is completed, the transfer block is retracted to a position directly under the drum where the tested part will drop out of the transfer block and into the output chute and the second part to be tested will drop into the top of the transfer block.

2.1.6 An optional feature of the Model 8071 is the POSI-FEED. The POSI-FEED ensures that carriers slide smoothly between the parts storage drum and the transfer block. An indicator allows the operator to see the number of carriers remaining in the indexed drum chute. For additional information, refer to the POSI-FEED instruction manual.

2.1.7 The output chute is composed of four sections: the lower intermediate section which is attached directly to the indexing mechanism assembly; the upper section of the output chute; the lower thermal barrier; and the lower section of the output chute which contains the electrical heating elements and the output photosensor. This section receives the output magazine to be loaded.

2.1.8 The IC carrier handling mechanism is a mechanical assembly within the chamber and is operated by a pneumatic actuator located in the controls compartment directly behind the controller. The motion of the actuator is transmitted to the mechanism by means of a torque tube passing through the insulated wall of the chamber. The torque tube is provided with a self-aligning rigid coupling that slips out of engagement

when the mechanism is removed from the chamber for servicing. For removal procedure see paragraph 6.3.

2.1.9 Drum indexing is accomplished every fourth cycle of the pneumatic actuator by a matched ratchet on the torque tube located at the upper rear portion of the mechanism.

2.2 The Delta Loop

2.2.1 The Delta Loop enables the Charger to operate in an automatic mode under the control of an integrated circuit test system. Further information may be found in a separate manual included in the information package.

2.2.2 The Delta Loop contains three additional circuits which improve the versatility of the Charger. These are the Transfer Inhibits, the Reprobe Cycle and the Buffered Input.

2.3 The DELTAGUARD

2.3.1 The DeltaGuard is a device that operates in conjunction with the controller. It automatically turns off the heat and coolant and sounds an alarm if the temperature control is lost. Further information may be found in a separate manual included in the information package.

3 INITIAL SETUP

3.1 Uncrating - Remove all shipping tie-downs.

3.2 Lubrication

3.2.1 Lubricate the IC carrier handling mechanism actuator air cylinder (Figure 3-1) by placing a few drops of light instrument or machine oil on the piston rod where it enters the cylinder.

3.2.2 Refer to Figure 3. The swivel mounting bolt at the lower end of the cylinder should be lubricated with a few drops of light oil whenever re-assembly occurs.

CAUTION

Never apply lubricant to any portion of the mechanism which operates within the environment test space.

3.3 Electrical Connection - Electrical power required is 240 volts, 50 or 60 cycle, Hz single phase AC, 3.3 KW.

3.3.1 For 208V operation, a 208V to 240V boost transformer must be used. Delta Design will factory equip the Charger with the proper boost transformer if so requested at the time the order is placed. (See schematic D1635102).

3.3.2 The circuit to which the chamber is to be connected should have a 30 ampere minimum rating. The outlet must be of the polarized type with a grounding lug. Be sure that all switches are OFF before plugging the chamber cord (Figure 4-1) into an outlet. THE CHAMBER MUST BE PROPERLY GROUNDED. Delta chambers that operate on 240 VAC employ a center-tapped auto transformer to obtain 120V for the coolant valve solenoid, failsafe relays, blowers, and for the controller. The heater circuit operates on 240 VAC.

3.4 Air Connection - The air connection is shown in Figure 4-2 and should be 100 PSI minimum.

3.5 Liquid Nitrogen Connection

3.5.1 Connect a liquid nitrogen withdrawal container to the LN_2 input fitting (Figure 4-8) of the chamber with an insulated transfer line. A relief valve must be installed in the line with a relief pressure of between 60 and 100 PSI for a 2,700 cubic foot, 50 PSI liquid withdrawal container. Liquid nitrogen is furnished by the supplier in withdrawal containers.

3.5.2 Water is very troublesome if it is allowed to enter the refrigerant

lines. Steps must be taken to prevent this. All lines, valves and connecting hoses should be blown out before the chamber is connected. If lines are opened to bleed off excessive pressure at shutdown, close them to prevent contamination by condensed moisture. This will help to keep ice from forming in the control valve. Operation to temperatures as low as -65°C is possible with LN_2 as the coolant.

CAUTION

LIQUID NITROGEN MAY CONTAIN
TRACES OF LIQUID OXYGEN WHICH
BOILS OFF LAST.

3.5.3 Any mixture of oil and liquid oxygen (LO_2 could result from oxygen condensing from the atmosphere) can be explosive, so care should be taken to thoroughly insulate all lines and fittings, including the sealing of exposed edges with RTV silicone, or a similar sealant.

3.5.4 A 60 PSI stainless steel valve and injector assembly, insulated in expanded polystyrene, (Figure 4-4) are used for liquid nitrogen applications.

3.5.5 Nitrogen gas supply for purging the chamber will connect at Figure 4-3.

3.6 Alignment

3.6.1 Check the alignment of the input chutes using the alignment bar P/N 1602817 (furnished). This alignment bar should be inserted into the input chute (Figure 1-3) at the top of the chamber to a depth of approximately 12-1/4 inches. The bar should fit freely, without being forced, and should come to a distinct bottoming-out stop. Do not force the bar. Forcing the bar may damage the internal mechanism.

3.6.2 Dimensionally, the input chute, the intermediate chute, and the parts storage drum should line up. However, due to such occurences as jarring during shipment, parts jamming and the replacement of parts, etc.,

the initial alignment may change. Corrective action should consist of determining the area of misalignment (by establishing the point at which the alignment bar stopped) then re-adjusting the components involved. In case misalignment of the transfer drum is the problem, see paragraph 6.4.

4 STARTING UP PROCEDURE

4.1 Precautions

4.1.1 Unplug the unit from all sources of electrical power and air before performing any type of settings or servicing, or the removal of components. The carrier handling mechanism in particular should not be handled while the air line is connected to the unit.

4.1.2 Do not turn to COOL without LN_2 connected. Without a supply of LN_2 the coolant valve solenoid will remain in the "open" position for a prolonged period, thereby overheating the holding coil.

4.1.3 Always operate the chamber at 150°C for at least 1/2 hour after prolonged operation below ambient temperature. This will allow any moisture build-up in the insulation to dry out.

4.1.4 Do not block air intakes for the blower motors and cooling fans (Figure 4-5).

4.1.5 Never replace a fuse (Figure 4-6) with other than the type originally used. Proper fuse rating is 20 AMP (fast blow). The use of improper fuses could cause damage to the equipment.

4.1.6 It is imperative that the correct test contactor is in place for the type article being tested.

4.1.7 When operating below ambient temperature, the pressure of the liquid nitrogen must be kept constant. If this is not done, the control temperature may fluctuate.

4.1.8 Do not leave liquid nitrogen trapped in a line (valves closed at both ends) because high pressures will be developed as the liquid

absorbs heat and becomes a gas.

4.1.9 Ground the case of the chamber to earth ground. The chamber must not be operated without the case being grounded.

4.2 Controls

CAUTION

Be sure that ALL switches are OFF before plugging the chamber cord into an outlet. The chamber MUST BE PROPERLY GROUNDED.

Refer to Figure 5. Controls related to the normal operation of the Charger are conveniently grouped on the front panel.

4.2.1 CHUTE HEATER Switch - The CHUTE HEATER switch (Figure 5-1) turns on heating elements which are located in the input and output chutes. These heaters prevent icing of the chutes when the chamber is operated below ambient temperature.

4.2.2 REMOTE/OUT/IN Switch - The REMOTE/OUT/IN switch (Figure 5-2) functions as follows: In the REMOTE position the IC carrier handling mechanism portion of the Charger will be cycled automatically in response to the external test equipment, a foot switch, or sort system, connected externally at location shown in Figure 8-6. The OUT position of the switch causes the handling mechanism to extend the IC carrier transfer block (Figure 17 & 18-32) to the test contactor position and maintain it there. The IN position of the switch causes the handling mechanism to retract the IC carrier transfer block to pick up a new carrier from the storage drum and maintain it in the retracted position.

4.2.3 FAILSAFE Indicator - The FAILSAFE indicator light (Figure 5-3) glows red when chamber temperature reaches FAILSAFE pre-set limit. Heat will automatically resume when chamber has cooled below FAILSAFE pre-set limit.

4.2.4 DELTA LOOP RESET Button - Depressing the DELTA LOOP RESET

button (Figure 5-4) removes the inhibit condition of the transfer mechanism thereby allowing normal operation to resume.

CAUTION

DELTA LOOP RESET button should only be depressed after conditions causing system inhibit have been corrected, i.e., carrier stuck in output chute, etc.

4.2.5 HEAT Switch and Indicator - On position allows controller to apply heat automatically to maintain selected temperature in chamber. Red light (Figure 5-5) is on steady when chamber is heating. Light blinks when chamber reaches selected temperature above ambient.

4.2.6 COOL Switch and Indicator - On position allows controller to apply coolant automatically to maintain selected temperature in chamber. Green light (Figure 5-6) is on steady when chamber is cooling. Light blinks when chamber reaches selected temperature below ambient.

4.2.7 POWER Switch and Indicator - On position - main power on. White light (Figure 5-7) glows when power is on.

4.2.8 TEMPERATURE SET- Dial or optional DIGITEMP- Chamber operating temperature is set by dialing the TEMPERATURE SET dial (Figure 5-8) or the digital thumb switches on the optional DIGITEMP to the desired degree. Refer to page 21 for setting procedures. Do not exceed the temperature limits of -65°C to 150°C.

4.2.9 MODE Selector - The MODE Selector (Figure 5-9) provides MANUAL operation, PROGRAM operation and four preset temperature positions.

4.2.9.1 MANUAL Position - TEMPERATURE SET dial determines chamber temperature.

4.2.9.2 PROGRAM Position - Programming resistance connected to program jack (Figure 4-7) at rear of unit selects chamber temperature.

4.2.9.3 Preset Temperature Positions - Four preset temperature positions are indicated on the MODE selector switch. These are preset to customer's requirements prior to shipment or can be later set by customer's trained personnel.

CAUTION

Do not set MODE selector on "PROGRAM" when no outside programmer is being used without the Safety Plug (on back panel, see Figure 4-7) connected. This will preclude any possibility of high temperature being accidentally obtained.

4.2.10 GUARD/BY-PASS - The GUARD/BY-PASS switch (Figure 5-10) determines whether the DeltaGuard circuit is being used or by-passed. During normal operation the GUARD/BY-PASS switch should be left in the GUARD position.

4.2.11 RESET Button The RESET button (Figure 5-11) when depressed will cause the red FAILURE indicator to go out and the yellow STANDBY indicator to come on. See paragraph 4.2.13 and 4.2.14. The RESET button is also depressed when the operating temperature is changed by dialing in a new number in degrees centigrade into the controller (Figure 5-8).

4.2.12 SOUND/SILENCE Switch - A failure condition indicated by the red FAILURE indicator is also accompanied by an audible horn signal. This audible signal can be silenced by means of a switch (Figure 5-12) located on the control panel. It is recommended, however, that this switch be left in the SOUND position during normal operation.

4.2.13 FAILURE Indicator - When the red FAILURE indicator (Figure 5-13) is on, the HEAT and COOL circuits are inoperative. Depressing the RESET button (Figure 5-11) will cause the FAILURE indicator to go out and the yellow STANDBY indicator to come on. See paragraph 4.2.14.

4.2.14 STANDBY Indicator - When the yellow STANDBY indicator (Figure 5-14) is on, this indicates that the unit is in the STANDBY interval during which the temperature is stabilizing at the value set on the TEMPERATURE SET or dialed into the DIGITEMP controller. When the unit has reached the set temperature, the STANDBY indicator will go off and the green NORMAL indicator will come on. See paragraph 4.2.15.

4.2.15 NORMAL Indicator When the green NORMAL indicator (Figure 5-15) is on, this indicates that the temperature is near the set temperature with the controller starting its cycling mode.

4.3 Maxi-Timer Adjustment

4.3.1 The Maxi-Timer is programmable from 500 ms to 20 seconds. It holds the transfer block in the full-out position for its programmed time period.

4.3.2 The time adjustment point is located on the Maxi-Timer P.C. board inside the compartment at the right hand side of the chamber. (Figure 6-2). The adjustment is made on potentiometer R5 (Figure 24).

4.3.3 The timer should be adjusted to meet the required soak-time for the particular test being conducted.

CAUTION

120 VAC power is present on the Delta Loop P.C. board at and near the triac Q9 (large heat sink). Use extreme care in making electrical adjustments since short circuits may cause substantial damage.

4.4 FAILSAFE Adjustment - This is an infrequent requirement, consequently, the control will be found by opening the right hand side panel. Figure 6-1 shows the location of the slotted FAILSAFE control. The temperature at which the control trips is increased by rotating the control counterclockwise.

4.4.1 Set the MODE selector to MANUAL.

4.4.2 Set TEMPERATURE SET dial (or digital thumb switches) to desired maximum temperature for the test. Refer to paragraph 4.2.8.

4.4.3 Turn POWER switch ON.

4.4.4 Turn COOL switch ON.

4.4.5 Turn HEAT switch ON.

4.4.6 Operate the chamber at the maximum temperature for the specific test to be performed and adjust the FAILSAFE control so that the FAILSAFE is on the verge of tripping.

CAUTION

DO NOT ADJUST THE FAILSAFE MORE THAN ONE FULL TURN TOWARDS LOWER TEMPERATURES (CLOCKWISE ROTATION) AFTER THE FAILSAFE LIGHT COMES ON AS THE THERMOSWITCH UNIT CAN BE DAMAGED BY FORCING. ALSO, DO NOT SET THE FAILSAFE ABOVE 160°C OR THE CHAMBER INSULATION MAY BE PERMANENTLY DAMAGED.

4.5 Dry Nitrogen System - Purging the temperature chamber may be accomplished by connecting a nitrogen gas source to the fitting located at the back of the chamber (Figure 4-3). The nitrogen gas flow rate may be controlled to suit the particular requirements by means of a hand valve (Figure 4-9).

5 LOADING THE CHARGER

5.1 Magazine Loading - The IC carriers in Figure 9-1 and 10-1 are loaded into the magazine (Figure 9-2 and 10-2) so that there is an upper and lower notch (3 and 3) on the right side of the IC carrier and one single upper notch (Figure 9-4 and 10-4) on the left side of the carrier. This arrangement holds true with all IC carriers processed by Delta Design equipment.

5.2 Hand Loading - To use the HAND LOADER P/N 2631533 (Figure 7) for the Charger in place of the magazine (Figure 1-1), insert the loader over the bayonet fittings (Figure 7-1) on the input chute.

5.3 Input Chute - IC carriers are loaded into the chamber either by hand, using the HAND LOADER P/N 2631533 described in paragraph 5.2, or by means of a magazine (Figure 1-1). Either is inserted over the bayonet fittings (Figure 1-2) on the input chute (Figure 1-3). The input chute contains two heating elements (Figure 11) which are switch operated on the front panel (Figure 5-1). Heater wires (Figure 5-16) extending between the terminal strip and the input chute (Figure 5-17 and 5-18) are external to the chamber in order to permit easy removal of the input chute assembly for servicing.

5.4 Output Chute - Tested IC components in carriers are discharged from the test chamber through the output chute (Figure 8-1) and into an empty magazine (Figure 8-2). A magazine is inserted into the output chute with the locking handle (Figure 8-3) in the upward position against the stop (Figure 8-4). With the magazine fully inserted the locking handle is lowered and the magazine is then locked into place. The output chute contains two heating elements (Figure 12) which are switch operated on the front panel (Figure 5-1). Heater wires extending between the terminal strip and the output chute are external to the chamber in order to permit easy removal of the output chute assembly for servicing.

5.4.1 Accessories, such as the Delta Three Bin Sort, the Five Bin Sort, or the Delta Two Position Sort System may be plugged into the sockets provided on the underside of the chamber. The sockets are shown in Figure 8 as 5 and 6.

5.5 Test Contactor Installation

CAUTION

Install only that test contactor (Figure 5-20) compatible with the parts to be handled. Installing the wrong contactor could cause serious damage to the contactor.

5.5.1 Switch the REMOTE/OUT/IN switch (Figure 5-2) to the IN position in order to retract the carrier transfer block from the test contactor (Figure 5-20).

5.5.2 Installation of the proper Delta ENVIRONMENTAL contactor and seal assembly (Figure 5-20 and 5-21) in the Charger is accomplished by inserting the contactor assembly into the front opening of the Charger. Tighten the two captive screws (Figure 5-22). Care should be exercised to ensure that the contactor is properly oriented with the Charger as outlined in the Seal Assembly Instruction Manual.

6 MAINTENANCE

6.1 Controller Calibration Procedure - For calibration of the controller, refer to the Controller Instruction Manual included as part of this information package.

6.2 Pneumatic System

6.2.1 The pressure regulator is adjusted to read 80 PSI on the gauge (Figure 3-2) by turning the screw (Figure 3-3) and locking it with the lock-nut.

6.2.2 Add a light instrument or machine oil to a level of one (1) inch in the right hand bowl (Figure 3-4) of the regulator.

6.2.3 Check that the left filter and moisture trap bowl (Figure 3-5) is clean and free of water. If water is present, pressing up on the stem in the underside of the bowl opens a cleanout valve, discharging the water to the atmosphere.

6.2.4 The pneumatic actuator for the Charger IC carrier handling mechanism is controlled by two valves.

6.2.5 The vertical flow control valve (Figure 3-6) controls the rate of extension of the piston. This motion coincides with the retraction of the IC carrier from the test contactor and returns it to the output chute where it is discharged from the machine. In the normal position, this valve is opened approximately one complete turn.

6.2.6 The horizontal flow control valve (Figure 3-7) controls the rate of retraction of the piston. This motion coincides with the presentation of the IC carrier to the test contactor after it has received it from the parts storage drum. In the normal position, this valve is opened approximately one complete turn. These flow control valves permit air to enter the cylinder at full gauge pressure and restrict air on the exhaust side of the piston.

6.3 Removal of IC Carrier Handling Mechanism

6.3.1 Disconnect electrical and air supply.

6.3.2 Remove chamber door (Figure 1-5).

6.3.3 If unit is equiped with optional POSI-FEED, remove the front and the top of the POSI-FEED enclosure.

6.3.4 Ensure that the plunger is in the UP position.

6.3.5 Remove the terminal strip cover (Figure 5-17) held down by two #6-32 screws, and disconnect the heater wires (Figure 5-16).

6.3.6 Next, remove the six knurled screws (Figure 5-19) and the upper section of the input chute can be lifted approximately one inch to clear the mechanism. Remove loose pieces of insulating material.

6.3.7 The Test Head Adapter Extension (D2631608) if mounted on the Charger must be removed.

6.3.8 The protection glass (Figure 13-1) must be removed by lifting up and out as shown. Remove the wire clip (Figure 13-2) so that the thermocouple probe (Figure 13-9) can be dismounted by loosening of the screws (Figure 13-5) on the clamping bracket. This will allow this assembly to be threaded over the top member (Figure 13-6) when the mechanism frame is later removed from the chamber. Remove the light socket and bracket (Figure 13-3) in a similar manner by removing the screws (Figure 13-4).

6.3.9 Remove the four #8-32 socket head screws (Figure 13-8) which hold the alignment plate (Figure 13-7).

6.3.10 Take out the four 1/4-20 socket head screws (Figure 14-1) from

the base of the mechanism. Pull the mechanism (Figure 14-6) straight out (towards door opening) until the coupling (Figure 14-2) is disengaged. Then it is necessary to lift the mechanism, as indicated by reference lines (Figure 14-3). This allows it to clear the lower section of the output chute (Figure 14-4) which protrudes through the floor of the chamber. At the same time, it will be necessary to hold the alignment plate up as shown (Figure (14-5) so that it also will clear the output chute.

6.3.11 Now pull the mechanism (Figure (14-6) out only far enough to disengage the wiring to the light (Figure 13-3) and thermocouple probe (Figure 13-9) from the frame as noted in paragraph 6.3.8.

6.3.12 With the light wiring disconnected, the mechanism may now be removed from the chamber. To replace the mechanism in the chamber, reverse the procedures.

6.4 Adjustment of Index Ring and IC Carrier Drum - Should the drum (Figure 15-1) which stores the IC devices to be tested become misaligned with the input and output chutes, it may be re-aligned by the following procedure:

6.4.1 Remove protection glass as described in paragraph 6.3.8.

6.4.2 The index ring (Figure 15-2) positively rotates the drum from one storage chute to the next. It is held in an adjustable manner to the storage drum shaft (Figure 16-1) by the stud (2) and a 3/8-24 hex nut (3). A tool P/N4200004 (Figure 15-3 and 16-4) is provided for loosening and retightening the nut. After the ring is loose on the shaft, use the Alignment Bar (also supplied) as outlined in paragraph 3.6. When Transfer Block, Storage Drum, and Input Chute are aligned, place a .060" thick spacing shim between one of the pins on the Index Wheel (Figure 17-36) and the top surface of the Index Slide Assembly (Figure 17-27) to establish clearance and tighten nut (Figure 16-3). It is recommended that a torque wrench be used and set for 300-350 inch pounds. Remove shim. Replace protection glass.

6.5 Adjustment of the Actuator Stroke

6.5.1 Loosen the hex nuts on the two shaft clamping pins (Figure 17-15).

6.5.2 Make certain that the coupling (Figure 17-11) between the torque shaft extension and the main torque shaft (Figure 17-34) is secure and allows no "free play" between the shafts.

6.5.3 Move the transfer block (Figure 17-32) to the full out (test) position. The lever assemblies (Figure 18-45 & 46) attached to the transfer block must compress the reseater springs (Figure 18-44) in the test position.

6.5.4 Move the actuator air cylinder shaft to its fully retracted position as shown in Figure 3-1.

6.5.5 Now extend the cylinder shaft (Figure 3-1) 0.1" from full retracted position.

6.5.6 Tighten the nuts on the torque shaft clamping pins (Figure 17-15) using a torque wrench setting of 155 minimum to 188 maximum inch pounds.

6.6 120V Transformer: Refer to schematic D1635102.

6.6.1 The 120V transformer is shown on the schematic and is called out as reference designator T1. The 120V transformer is an auto-transformer; it's purpose is to allow 120V components to be operated in a 240V environment. The two ends of the transformer are connected across the 240 VAC supply.

6.6.2 The 120V load is balanced across the 240V line with the center tap of the transformer supplying the unbalanced current.

6.6.3 Electrical power required is 240 volts, 50 or 60 cycle, Hz, single phase AC, 3.3 KW.

6.6.4 For 208V operation, a 208 V to 240V boost transformer must be used. Delta Design will factory equip the Charger with the proper boost transformer if so requested at the time the order is placed (See schematic noted in paragraph 6.6).

7 TROUBLE SHOOTING

7.1 The Controller - A separate Controller Instruction Manual is provided as part of this information package. However, the following factors will greatly aid the trouble shooting procedures:

a. The red HEAT lamp is connected across the controller heat output. A brightly glowing red lamp is an indication that the heaters are energized.

b. The green COOL lamp is connected directly across the coolant valve solenoid and when glowing brightly indicates power is applied to the solenoid.

c. Turning the MODE switch to PROGRAM, with the safety plug connected, should extinguish both the HEAT and COOL lamps.

(Waves forms and DC voltages are shown in the Controller Instruction Manual).

7.2 The Delta Loop

7.2.1 Refer to the Delta Loop Instruction Manual for the Delta Loop with reprobe. The Delta Loop is an electronic circuit which controls the power to the solenoid (Sol. 4 on D1635102) which in turn controls the air supplied to the air actuated valve of the transfer arm. When the Delta Loop applies power to the solenoid, the solenoid allows air pressure to the transfer arm. This pressure causes the transfer to move from the test position (full-out) into the chamber to the drop-pickup position (full-in). When the Delta Loop removes power from the solenoid, the transfer returns, with a new device, to the test position.

CONDITION	POSSIBLE CAUSE	TO CLEAR	REMEDY
7.3 Parts stuck between Input Chute and Intermediate Chute.	Mis-alignment of Chutes. Or; TO-5 protruding from back of carrier (unit loose in carrier) hangs up on interface. In this case, refer to parts manufacturer.	The jammed part will have to be pulled back and out through the Input Chute. To do this may require a button-hook shaped wire.	Correct mis-alignment of chutes by inserting the Alignment Bar. See paragraph 3.6.
7.3.1 Storage Drum will not index.	Jam between Intermediate Chute P/N 1630324 and the Storage Drum P/N 2630701.	See 7.3 "To Clear" (Above)	Use Alignment Bar. See paragraph 3.6.
	Intermediate Chute misaligned with the Storage Drum.	See 7.3 "To Clear" (Above)	Use Alignment Bar. See paragraph 3.6.
	Carrier partially into the Transfer Block and partially into the Storage Drum. This is usually caused by bent or damaged carriers. Or; Tested carrier in Transfer Block does not drop into Output Chute. The following carrier drops into the Transfer Block and two parts jam together as the Transfer Block moves forward.	Remove the Test Contactor and Seal (Fig. 5) and rotating the actuator mechanism by hand, move the Transfer Block slowly toward the "back" position. As the block moves, reach through the test contactor opening with a screw driver and lift the carrier, keeping the carrier against the tapered underside of the Driver P/N 1606109. This will place the part above the support pin in the Transfer Block. The carrier must get above the pin to prevent its being crushed. Now the carrier in the rear of the Transfer Block should drop out through the Output Chute. If the part is sufficiently bent it may have to be pushed out.	
7.3.2 Parts jammed in Transfer Block.	Transfer Block not traveling sufficiently far "back" to allow the carrier to drop into the Output Chute.		The actuator stroke must be re-adjusted. To do this, loosen the Transfer Block Arm P/N 1630750 on the Torque Shaft P/N 1630751. Move the Transfer Block to the full "back" position. The arm should now be in its proper position (its back edge should be parallel vertically with the back of the chamber.) At this time check the clearance between the Index Return Shaft P/N 1630746 and the stop plate on the Index Arm P/N 2630747. There should be approximately 1/32 of an inch clearance. If an adjustment is necessary it can be accomplished by moving the clevis P/N 1605052 on the Transfer Block shaft. With the Transfer Arm and Block now in proper position, the Actuator Air Cylinder P/N 3600094 should be in a fully extended position. To provide a pre-loading of the mechanism, the air cylinder piston should be retracted approximately 3/16 of an inch. The arm should now be locked to the Torque Shaft again by tightening the 3/8 nut. At this time the Indexing Arm should be adjusted so that the arm rotates the Ratchet Gear leaving a clearance of approximately 1/16 of an inch between the Gear and the Stop Spring. This adjustment can best be made by loosening the screw in the ratchet plate. Check the Transfer Block to make certain that it is in a completely back position, then tighten the ratchet plate screw.

CAUTION

Before Performing any Mechanical Trouble Shooting the Air Pressure Must Be Off.

TROUBLE SHOOTING: ELECTRICAL

HOW TO USE THIS CHART

1. Turn Mode Switch to Manual.
2. Note Thermometer Reading (Chamber Temperature)
3. Turn Heat and Cool Switches On.
4. Turn Temperature Set Control 50° Higher than Chamber Temperature and note the conditions of the Heat and Cool Lamps.
5. Turn Temperature Set Control 50° Lower than Chamber Temperature and note the conditions of the Heat and Cool Lamps.

These two situations determine the correct block to read in the chart:

6. Enter the Chart at the Top for the conditions observed in step 4. (50° Higher than Chamber Temperature.)
7. Enter the Chart at the Left Side for the conditions observed in step 5. (50° Lower than Chamber Temperature.)

LIGHT STATE WITH TEMPERATURE SET DIAL 50° LOWER THAN CHAMBER TEMP.		LIGHT STATE WITH TEMPERATURE SET DIAL 50° HIGHER THAN CHAMBER TEMP.			
		RED - OFF GREEN - OFF	RED - ON GREEN - OFF	RED - OFF GREEN - ON	RED - ON GREEN - ON
	RED - OFF GREEN - OFF	Probe Element shorted to case. (Replace) Failure on Amplifier P.C. Board. (Trace signal with scope) Transformer Winding open.	Cool Circuit has failed. Trace signals with scope.		
	RED - ON GREEN - OFF		Probe shorted out. Temp. set Pot. — open. Cool Anticipator winding open. Check between Terminal A and Case of Q8 for 10Ω.		
	RED - OFF GREEN - ON	Failsafe Relay K1 not energizing. Coil resistance will be Approx. 10K. Failsafe open. Heat Triac failed.	NORMAL	Probe Open. Temp. Set. Pot. shorted. Heat Anticipator Winding open: Check between B and Case of Q9 for 10Ω.	Cool Circuit has failed — Trace signal with scope.
	RED - ON GREEN - ON		Heat circuit has failed — Trace signal with scope. Triac failed.		

8 SETTING THE DIAL TEMPERATURE INDICATOR

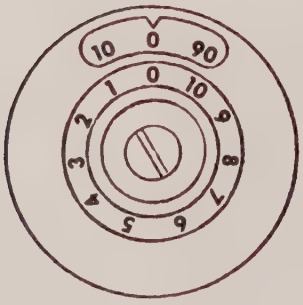
8.1 Description

8.1.1 Refer to example A - Set both dials at zero.

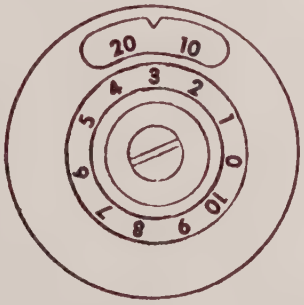
8.1.2 One complete rotation of the knob equals 100°. Clockwise is plus (+) degrees (F. or C) and counter-clockwise is minus (-) degrees. Each rotation of the knob is indicated by the small dial nearest the knob.

8.1.3 The large dial indicates each degree, every tenth numbered. Thus, as in example B, the large dial is set at 15, and the small dial is beyond 3, therefore the setting is +315°.

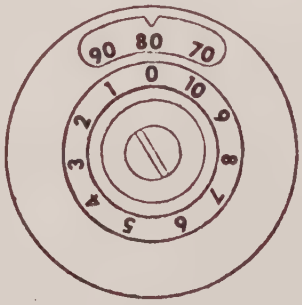
8.1.4 When setting to a minus (-) temperature it is necessary to subtract the degrees from 100, i.e., 20 from 100 equals "80" reading on the large dial to have a setting of -20°. This is shown in example C. It will be noted that the zero on the small dial is just to the left of the marker. Also, on the models having a range greater than -100°, it is necessary to keep track of the counter-clockwise rotation of the knob.



A
(0°)



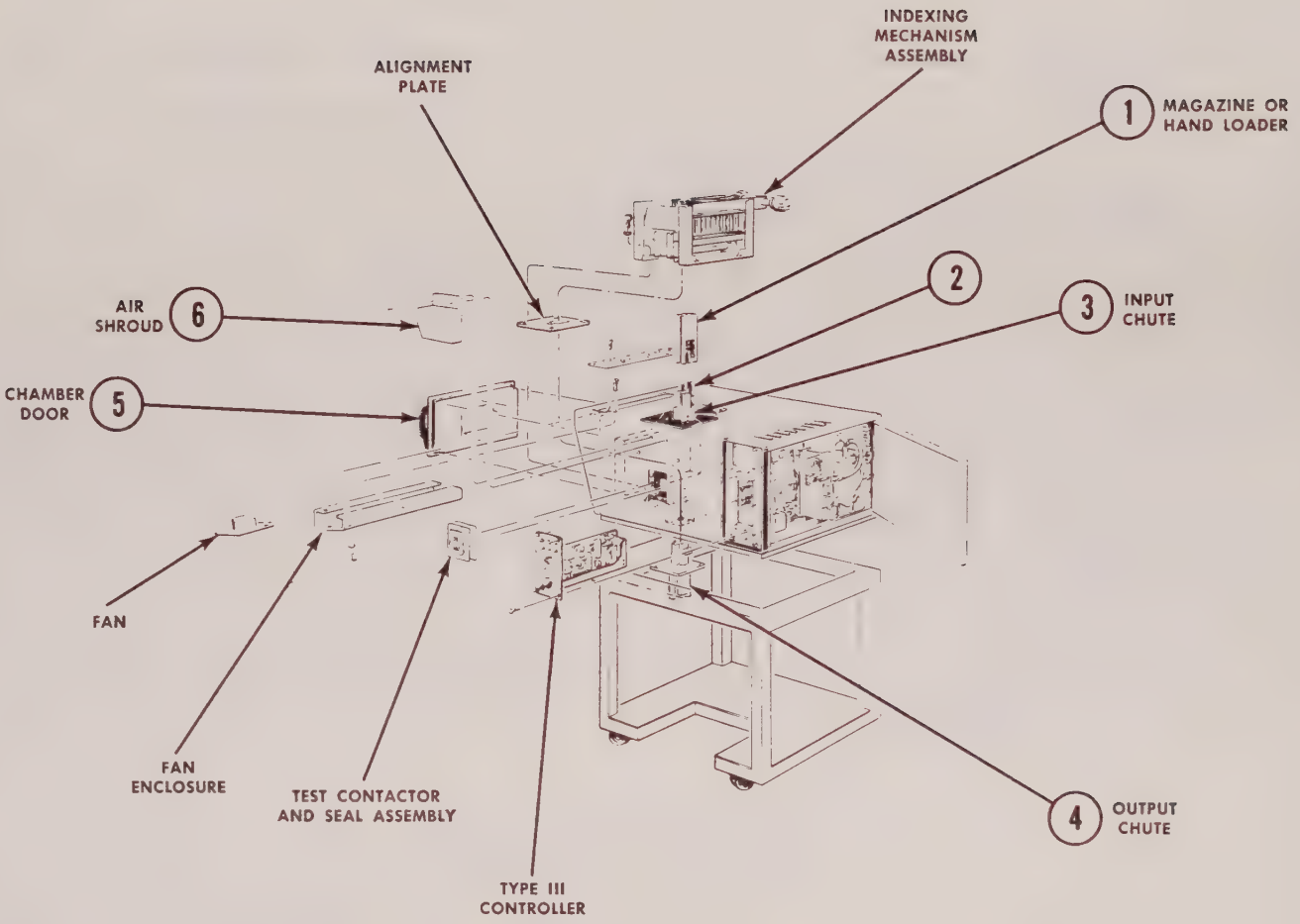
B
(+315°)



C
(-20°)

9 WARRANTY

All parts and performance of the Model 8071 SUPERCHARGER assembly are warranted for a period of 90 days. Where components are warranted by the manufacturer (other than Delta Design, Inc.) such warranty is transferred to the customer.



Major Component Location
FIGURE 1

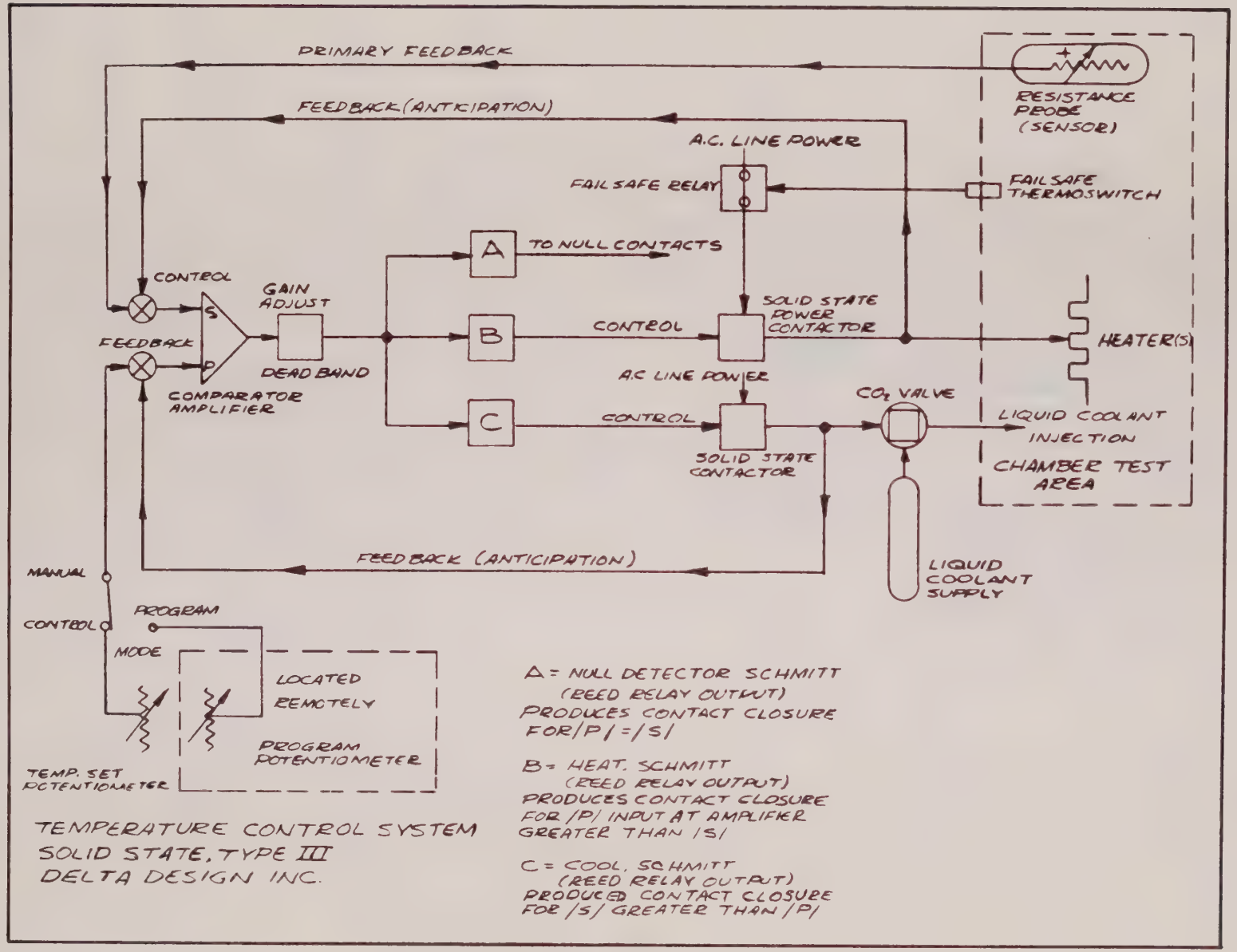
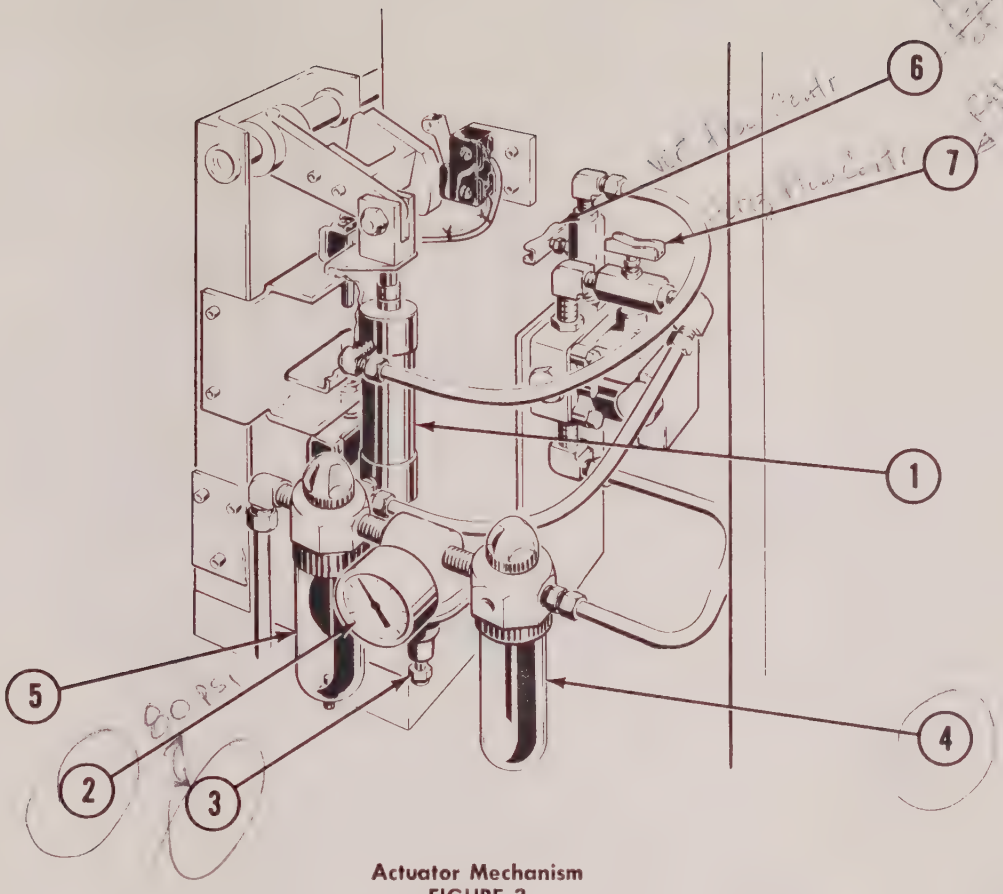
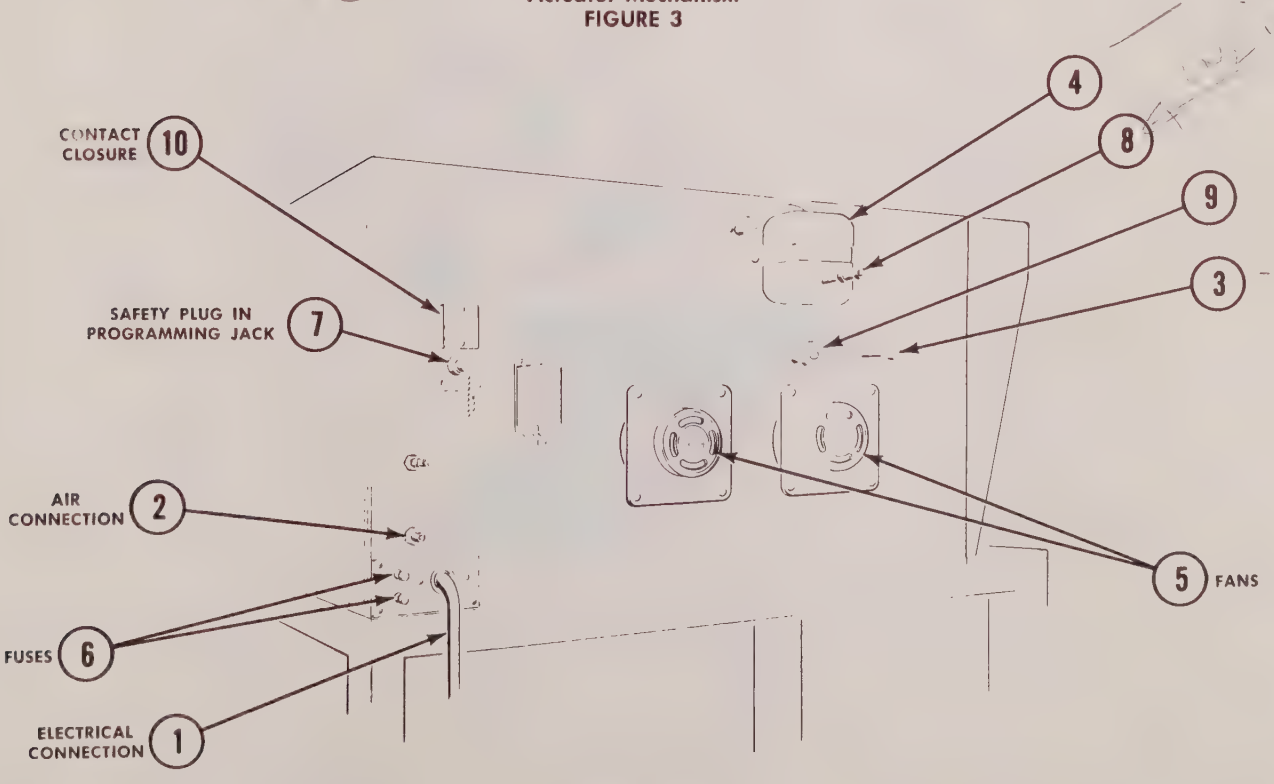

PRIMARY FEEDBACK
FEEDBACK (ANTICIPATION)
RESISTANCE PROBE (SENSOR)
A.C. LINE POWER
FAIL SAFE RELAY
FAILSAFE THERMOSWITCH
A
TO NULL CONTACTS
CONTROL
GAIN ADJUST
B
CONTROL
SOLID STATE POWER CONTACTOR
HEATER(S)
FEEDBACK
DEAD BAND
COMPARATOR AMPLIFIER
A.C LINE POWER
CO2 VALVE
C
CONTROL
LIQUID COOLANT INJECTION
SOLID STATE CONTACTOR
CHAMBER TEST AREA
FEEDBACK (ANTICIPATION)
LIQUID COOLANT SUPPLY
MANUAL
CONTROL
PROGRAM
MODE
LOCATED REMOTELY
PROGRAM POTENTIOMETER
TEMP. SET POTENTIOMETER
A = NULL DETECTOR SCHMITT (REED RELAY OUTPUT) PRODUCES CONTACT CLOSURE FOR /P/ = /S/
B = HEAT. SCHMITT (REED RELAY OUTPUT) PRODUCES CONTACT CLOSURE FOR /P/ INPUT AT AMPLIFIER GREATER THAN /S/
C = COOL. SCHMITT (REED RELAY OUTPUT) PRODUCED CONTACT CLOSURE FOR /S/ GREATER THAN /P/
TEMPERATURE CONTROL SYSTEM
SOLID STATE, TYPE III
DELTA DESIGN INC.

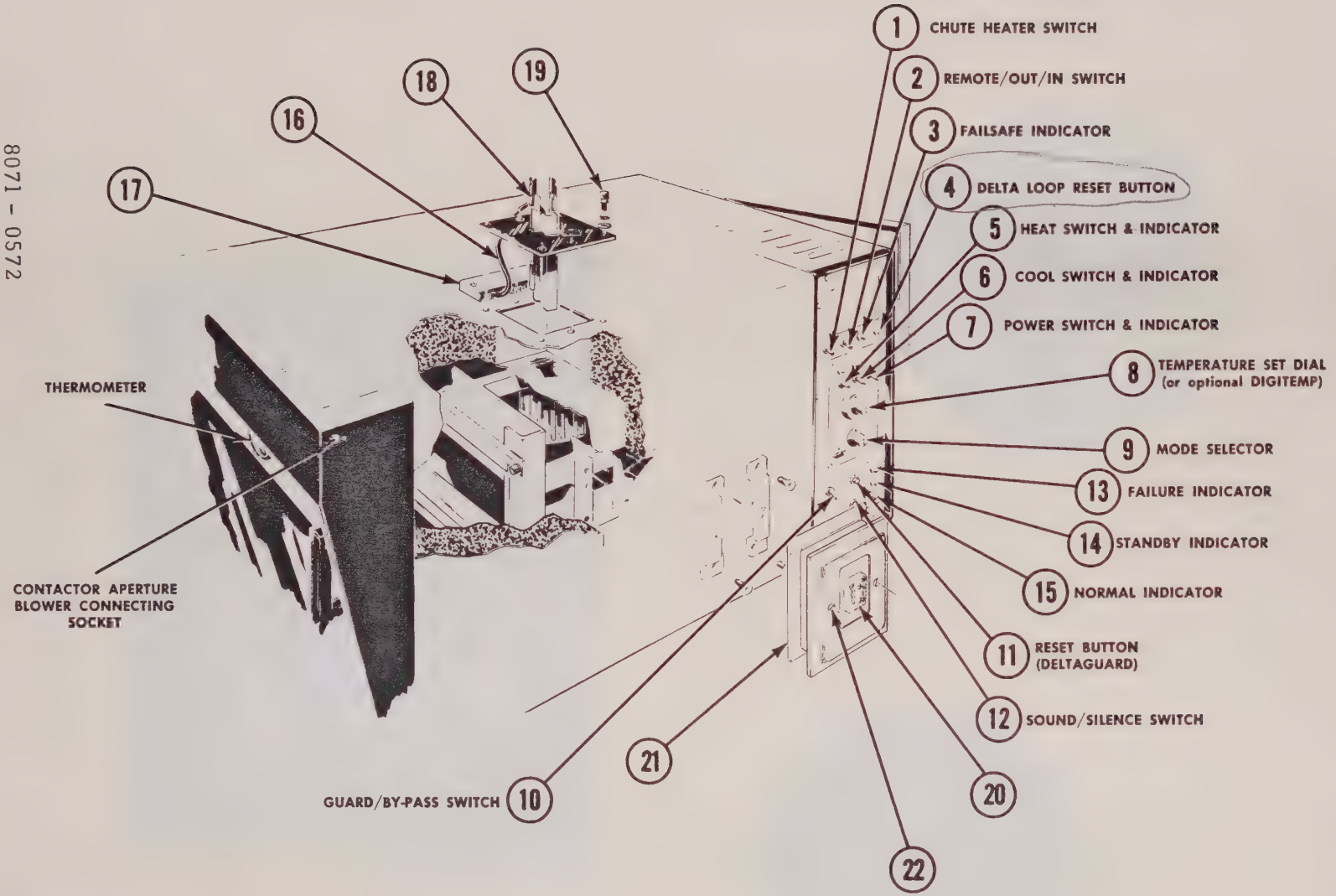
FIGURE 2



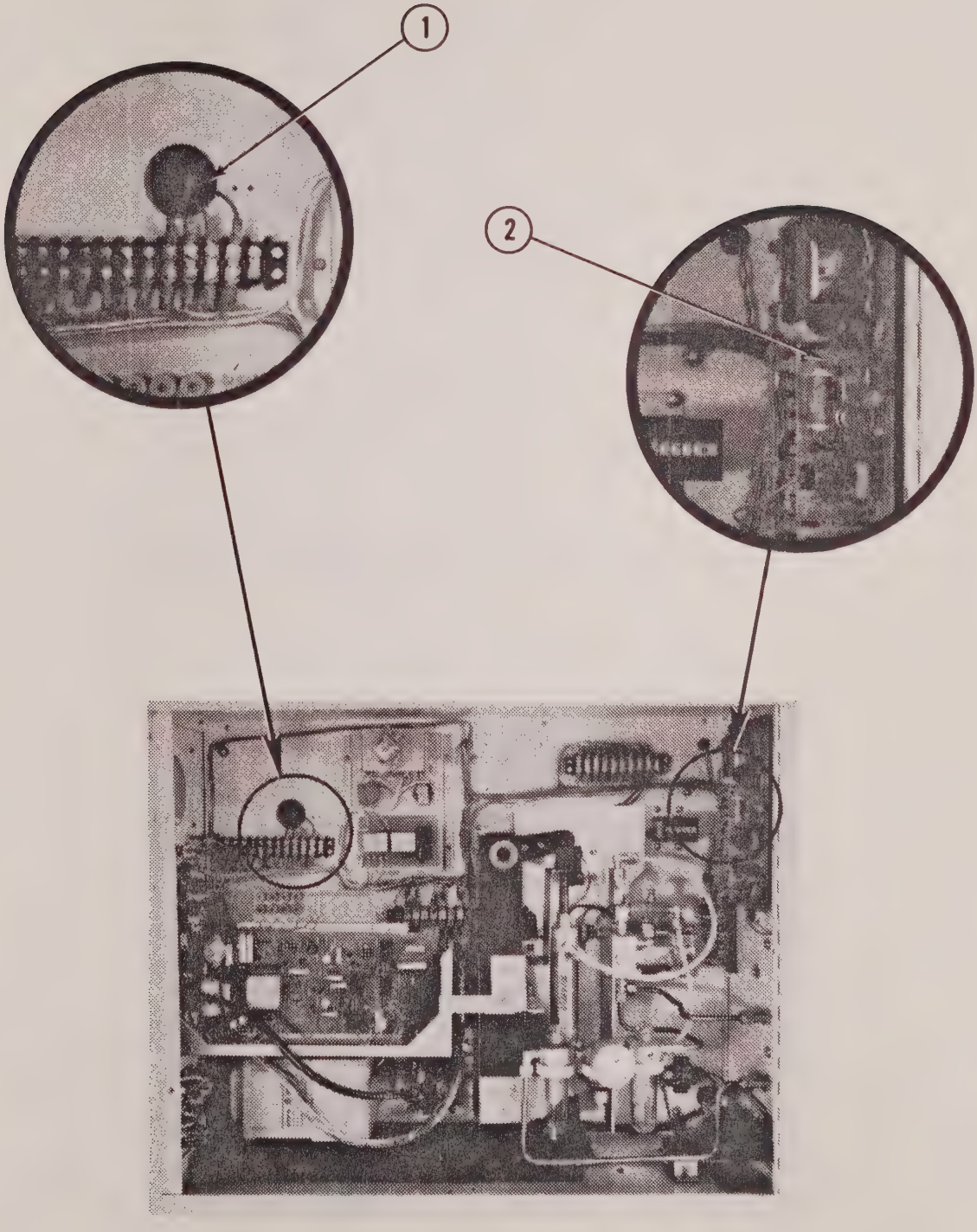
Actuator Mechanism
FIGURE 3



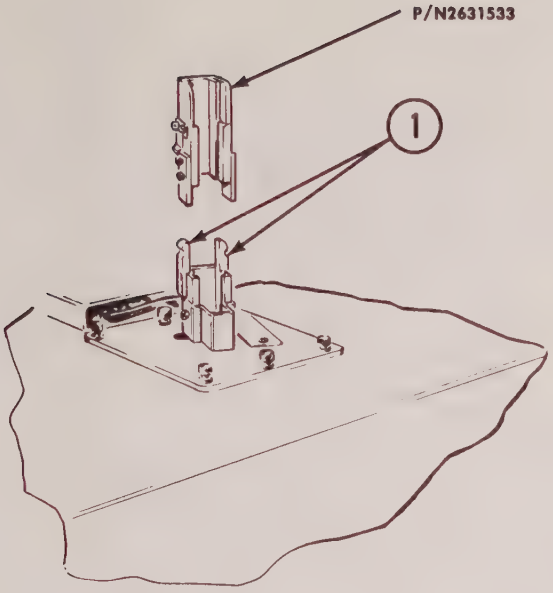
Back Panel
FIGURE 4



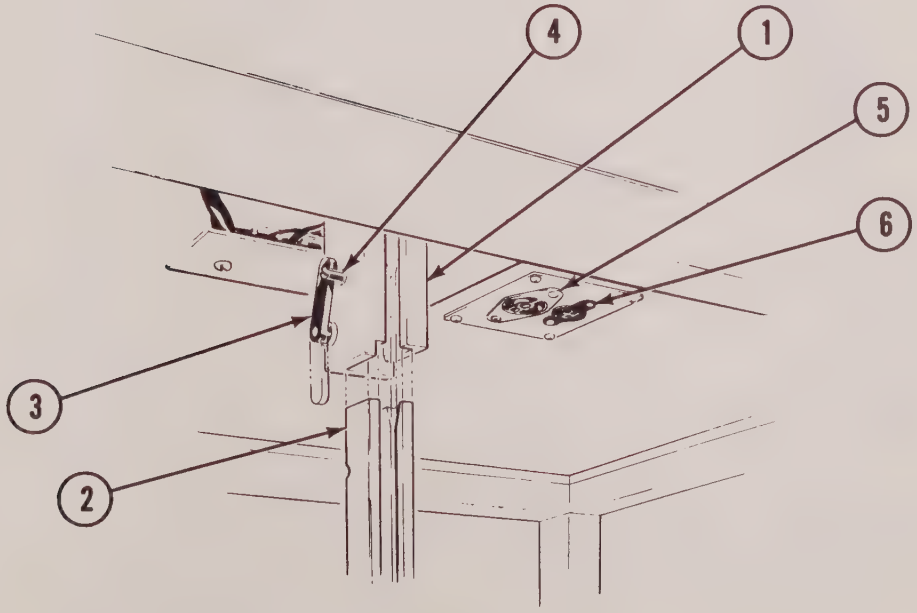
Controls/Contactor-Seal Assembly/Input Chute Removal
FIGURE 5



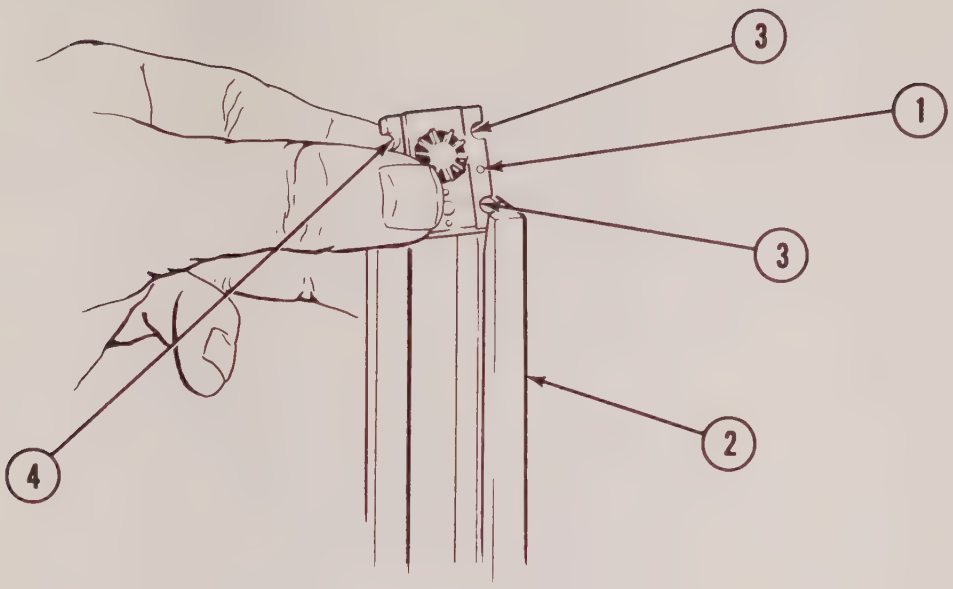
Chamber (view from R.H. side with door open)
FIGURE 6



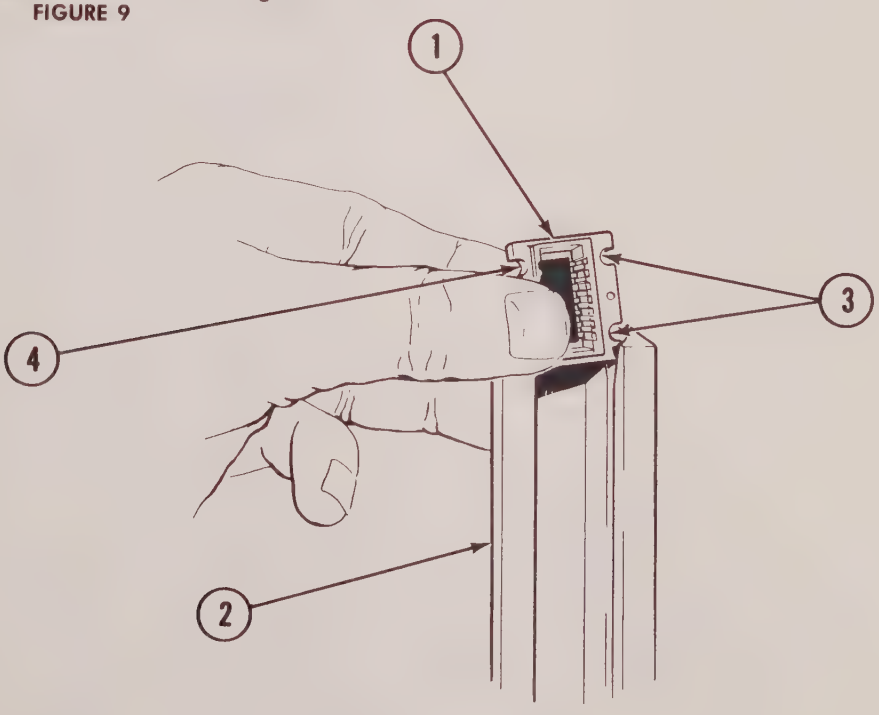
Hand Loader in Place of the Delta Magazine
FIGURE 7



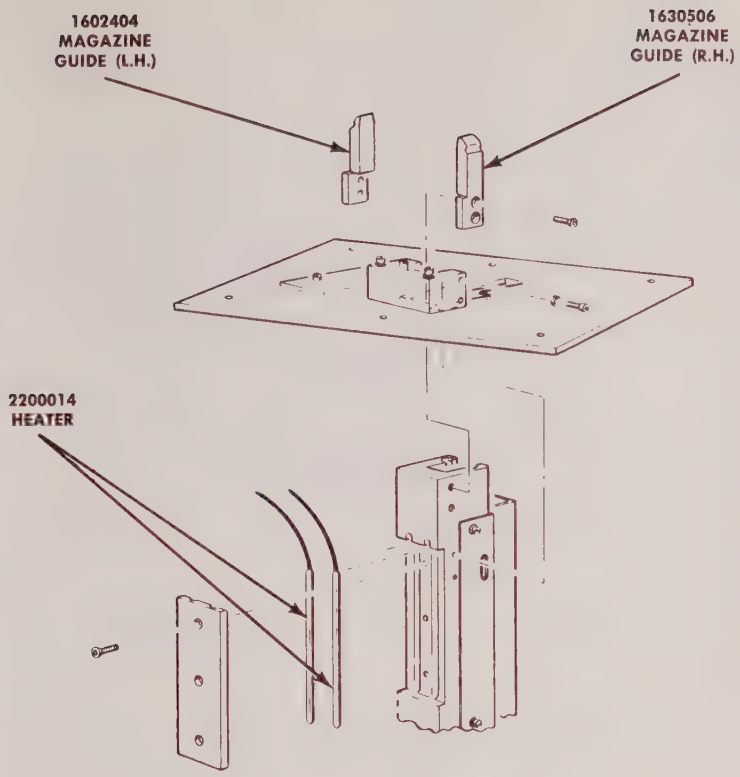
Output Chute
FIGURE 8



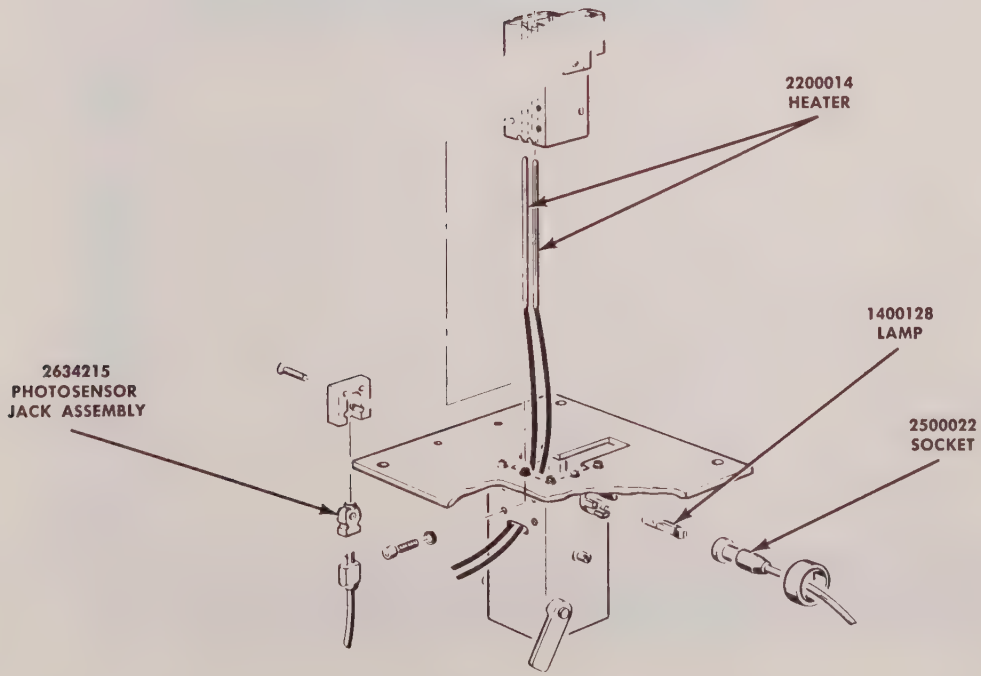
Loading the Carrier (TO-5) into the Magazine
FIGURE 9



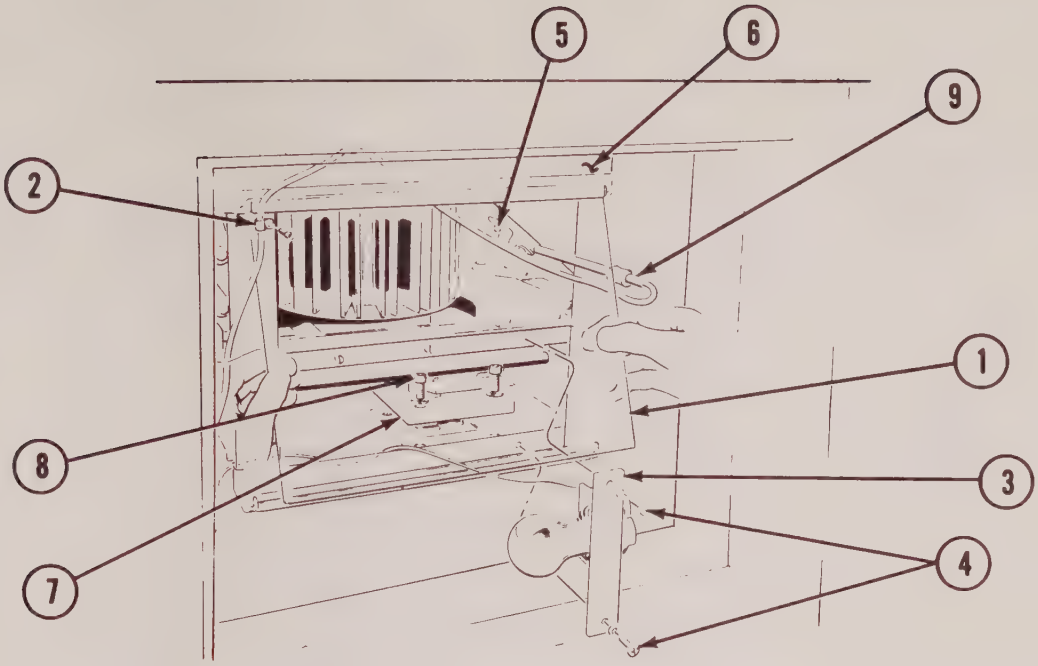
Loading the Carrier (DIP) into the Magazine
FIGURE 10



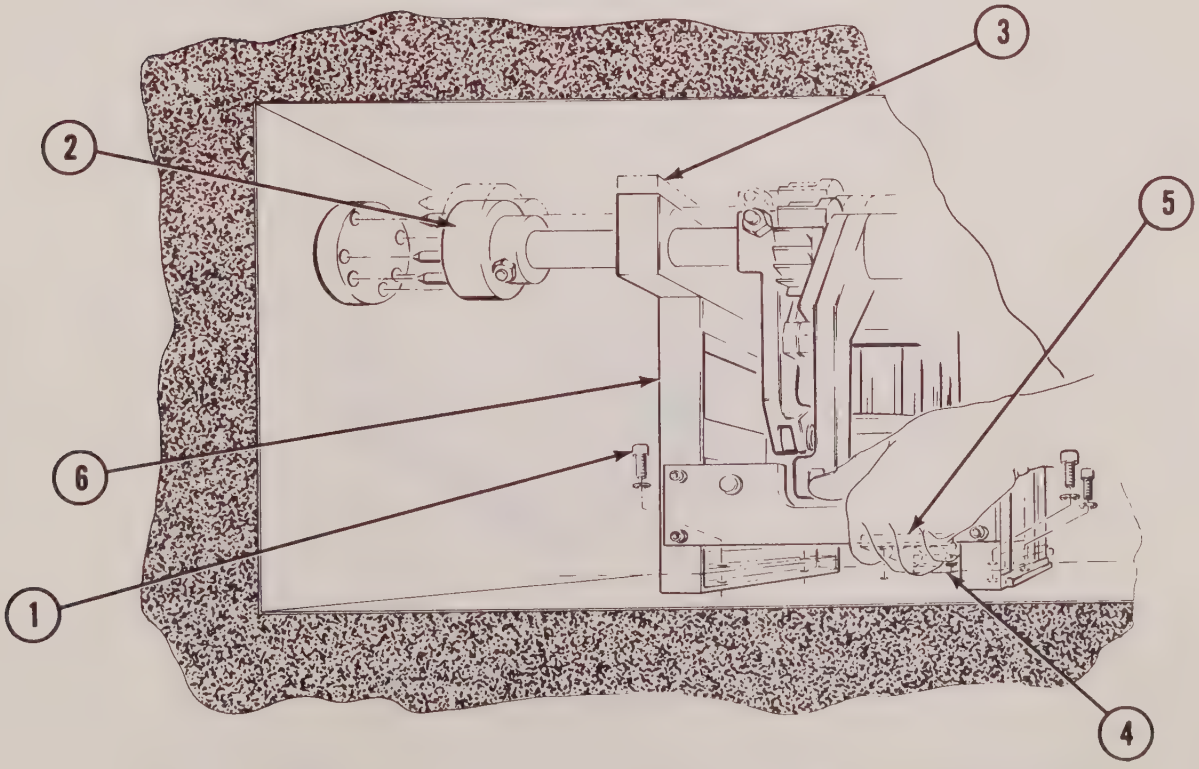
Input Chute Assembly
FIGURE 11



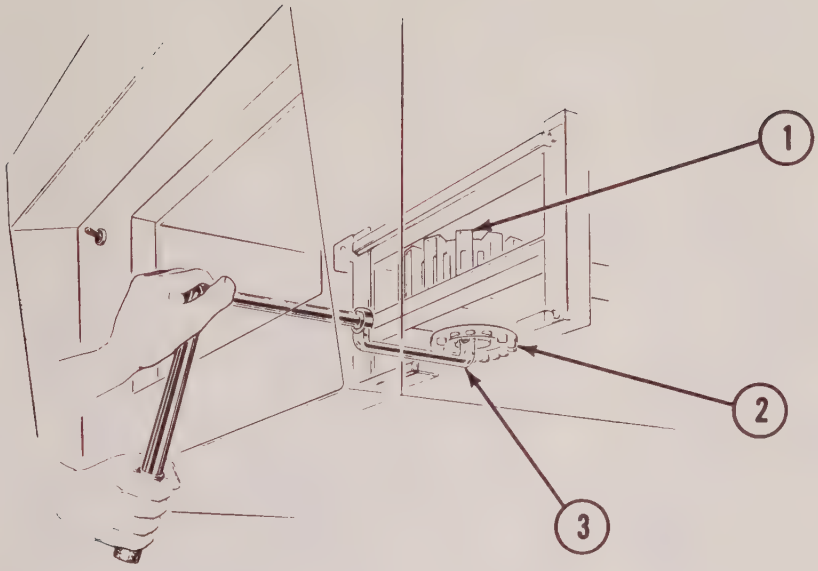
Output Chute Assembly
FIGURE 12



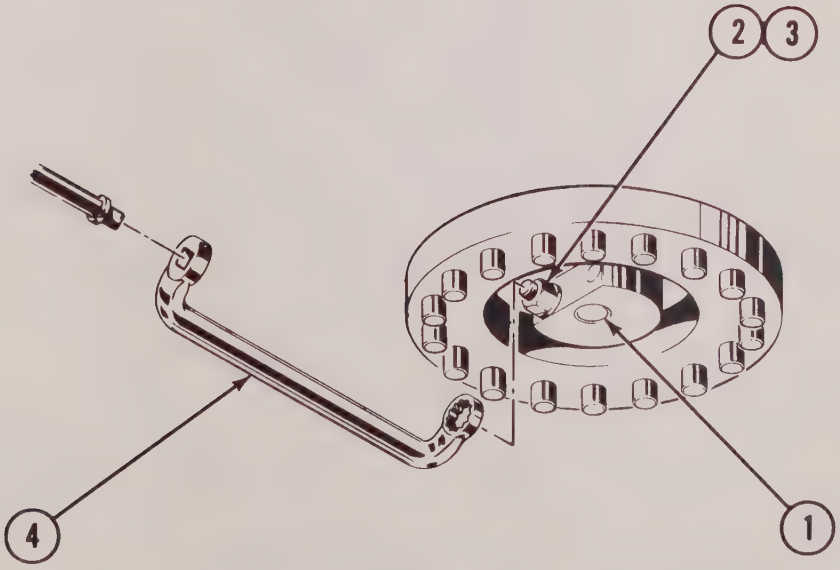
Preparing to Remove the Handling Mechanism
FIGURE 13



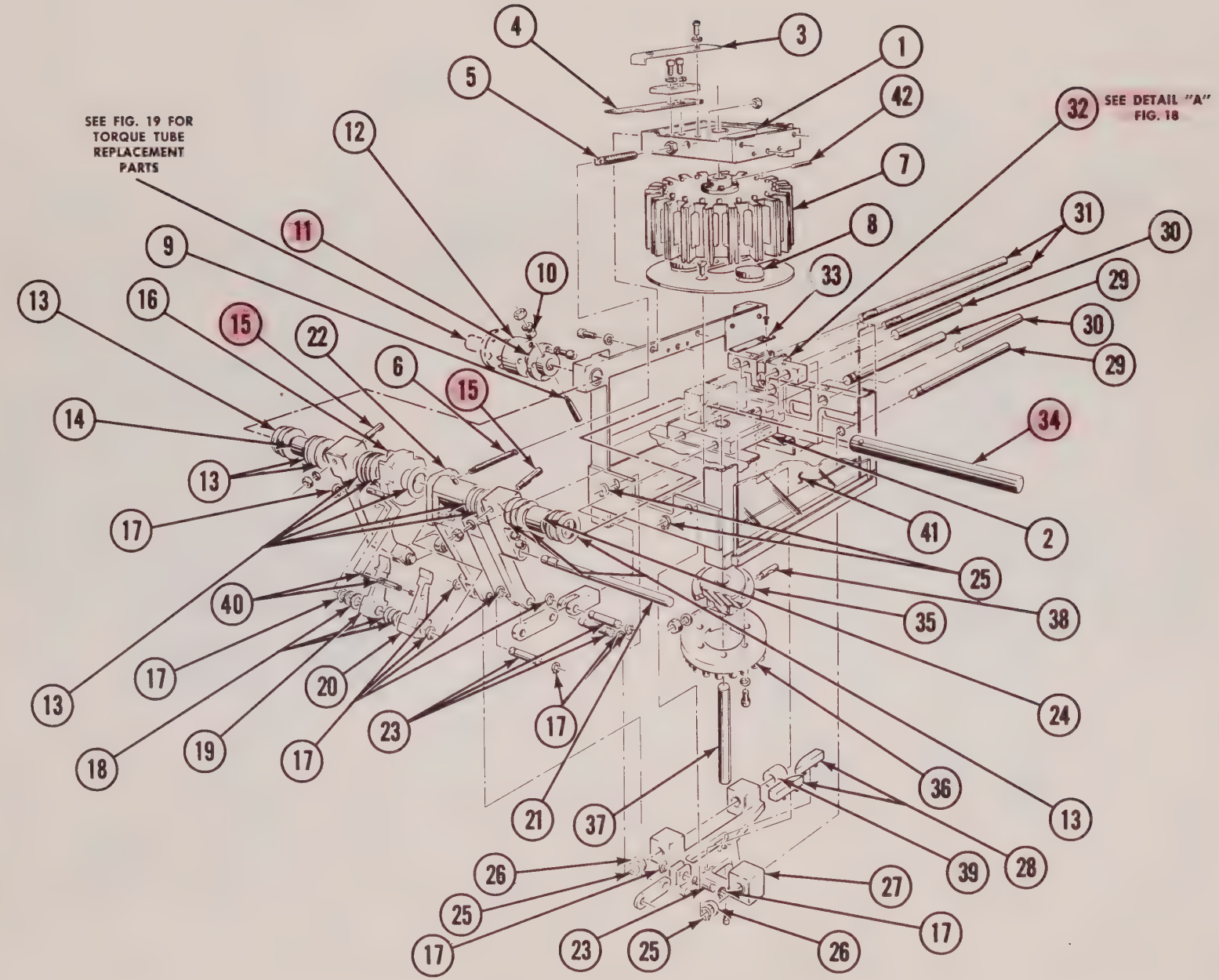
Removing the Handling Mechanism
FIGURE 14



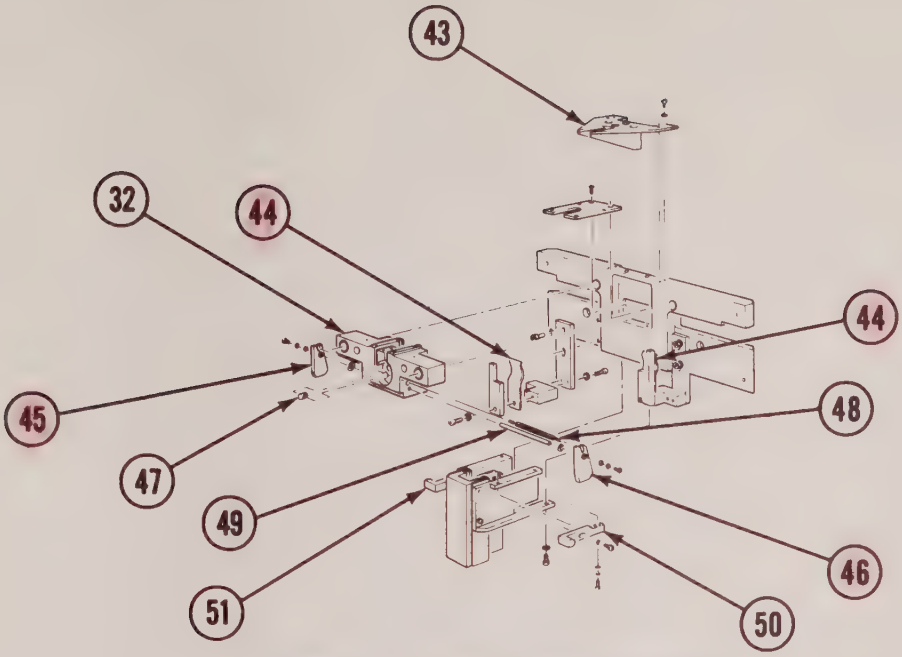
Adjusting the Index Ring and Drum
FIGURE 15



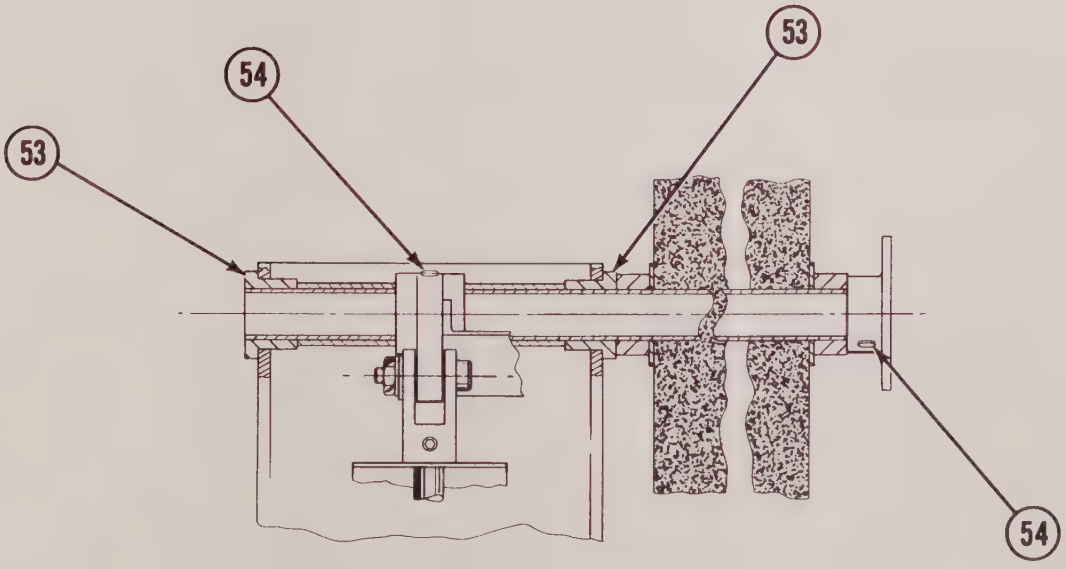
Application of Index Ring Wrench (P/N4200004)
FIGURE 16



Carrier Handling Mechanism-Illustrated Parts Breakdown
FIGURE 17



Detail "A" of Carrier Handling Mechanism-
Illustrated Parts Breakdown
FIGURE 18



Torque Tube Assembly
FIGURE 19

PARTS LIST

TITLE: CARRIER HANDLING MECHANISM REV:

ITEM	PART NUMBER	DESCRIPTION	QUANTITY
1	1630832	TOP BUSHING BLOCK	1
2	1606108	BOTTOM BUSHING BLOCK	1
3	1634156	INDEX SIGNAL SPRING	1
4	1630774	HOLDING RATCHET SPRING	1
5	1630909	EYE BOLT	1
6	4100353	SPRING	1
7	2630701	DRUM ASSEMBLY	1
8	1630572	PLUG	2
9	1630360	TAPER PIN	1

PARTS LIST (cont.)

ITEM	PART NUMBER	DESCRIPTION	QUANTITY
10	1500833	WASHER	1
11	1630142	COUPLING	1
12	2630356	COUPLING SPACER	1
13	1630770	WASHER - RULON	11
14	1630778	SLEEVE	1
15	1630773	SHAFT CLAMPING PIN	2
16	2630767	RATCHET GEAR	1
17	1500608	RETAINING RING (.375 I.D. x .025 THK)	15
18	1630776	WASHER - RULON	3
19	2630764	TRANSFER PAWL	1
20	2630765	INDEX PAWL	1
21	1630746	INDEX RETURN SHAFT	1
22	1630768	INDEX RATCHET PLATE	1

PARTS LIST (cont.)

ITEM	PART NUMBER	DESCRIPTION	QUANTITY
23	1630761	CLEVIS SHAFT	6
24	1630777	SLEEVE	1
25	1500611	RETAINING RING (.500 I.D. x .035 THK)	4
26	1630910	INDEX SLIDE BUMPER	2
27	2630760	INDEX SLIDE ASSEMBLY	1
28	1630757	LINEAR CAM	2
29	1630762	INDEX SLIDE SHAFT	2
30	1603223	TRANSFER SLIDE SHAFT	2
31	1605034	TRANSFER SHAFT	2
32	2606116	TRANSFER BLOCK	1
33	1631094	UPPER SKID	1
34	1630751	SHAFT	1
35	1630753	INDEX WHEEL HUB	1

PARTS LIST (cont.)

ITEM	PART NUMBER	DESCRIPTION	QUANTITY
36	2630752	INDEX WHEEL	1
37	1605022	DRUM SHAFT	1
38	1630755	SHAFT CLAMPING PIN	1
39	1630769	INDEX SLIDE BUMPER	1
40	4100352	SPRING	2
41	1630381	GLASS	1
42	3600143	DOWEL PIN - .188 DIA x 1.0 LG	1
43	1606109	DRIVER ASSEMBLY	1
44	1634566	LEAF SPRING	2
45	2633212	LEVER ASSEMBLY, RIGHT HAND	1
46	2633213	LEVER ASSEMBLY, LEFT HAND	1
47	1632549	PLUNGER	1
48	1632008	CROSS PIN	1

PARTS LIST (cont.)

ITEM	PART NUMBER	DESCRIPTION	QUANTITY
49	1632804	LEVER SHAFT	1
50	1633023	STOP, RIGHT HAND	1
51	1633024	STOP, LEFT HAND	1
52	1606109	DRIVER ASSEMBLY	1
53	4100028	BUSHING - FLANGED	2
54	1500831	TAPER PIN	2

PARTS LIST

TITLE: SCHEMATIC SUPERCHARGER MODEL 8071 REV:

ITEM	PART NUMBER	DESCRIPTION	QUANTITY
1	1635102	SCHEMATIC	REF
2	2621001	BLOWER MOTOR ASSEMBLY BM1,2	2
3	2100630	BLOWER MINI-BOXER BM4-6	3
4	0800007	CAPACITOR C1,2	2
5	0702500-400	CAPACITOR C3,5,6	3
6	1500702	VOLTAGE SUPPRESSOR CR1	1
7	1400084	LAMP 120V DS1-3	3
8	1400076	LAMP SOCKET XDS1-3	3
9	1500704	BUZZER BU40	1
10	1400082	NEON LAMP DS5	1
11	1400070	LAMP D56	1

PARTS LIST (cont.)

ITEM	PART NUMBER	DESCRIPTION	QUANTITY
12	2000064	SOCKET XDS6	1
13		LAMP 24V DS7,8	2
14	1400038	FUSE 20 AMP F1,2	2
15	1400051	FUSE HOLDER XF 1,2	2
16	2300004	THERMOSWITCH FAILSAFE FS1	1
17	2622512	HEATER ASSEMBLY H1,2	2
18	2200014	HEATER H3,6	4
19	2000146	LOCK FOR J9 &J10	4
20	2000044	CONNECTOR 4 PIN J1	1
21	2600409	PROGRAM SAFETY PLUG P1	1
22	2000023	SOCKET, FEMALE 2 PIN J3, 6	2
23	2000018	PLUG, MALE 2 PIN P3, 6	2
24	2000010	PLUG, FEMALE J7	1

PARTS LIST (cont.)

ITEM	PART NUMBER	DESCRIPTION	QUANTITY
25	2000011	PLUG, MALE P7	1
26	2000008	SOCKET J8	1
27	2000144	SOCKET 4 PIN J9	1
28	2000145	SOCKET 33 PIN J10	1
29	1400212	RELAY 3 POLE K1	1
30	1400218	RELAY 2 POLE K2	1
31	2500009	SOCKET RELAY XK1	1
32	2619034	CONTROL LN_2 VALVE L1	REF
33	A1231	DELTAGUARD PC BOARD ASSEMBLY PC1	1
34	0400008	COMPENSATION RESISTOR R1	1
35	2300031	PROBE, TEMP R2	1
36	0310000-500	RESISTOR R3,5,7	3
37	1400181	SWITCH SPST S1, 3	2

PARTS LIST (cont.)

ITEM	PART NUMBER	DESCRIPTION	QUANTITY
38	1400144	SWITCH, MOM. S2	1
39	1400156	SWITCH SPDT IN-OUT-REMOTE S5	1
40	2000147	PLUG 33 PIN P10	1
41	1400282	TRANSFORMER T1	1
42	1400287	TRANSFORMER 208V	OPTIONAL
43	1400519	TERMINAL BLOCK 12 PIN TB1	1
44	1400521	TERMINAL BLOCK TB2,3	2
45	1400510	TERMINAL BLOCK TB 4, 13	2
46	1400509	TERMINAL BLOCK TB5	1
47	1400519	TERMINAL BLOCK TB6	1
48	1400544	TERMINAL BLOCK TB8	1
49	1400420	TERMINAL BLOCK TB 14, 15	2
50	1400181	SWITCH (CHAMBER LIGHT) S13	1
51	1400161	SWITCH (RESET) S14	1

PARTS LIST (cont.)

ITEM	PART NUMBER	DESCRIPTION		QUANTITY
52	1400181	SWITCH (HEATER) S15		1
53	1400514	TERMINAL BLOCK TB12		2
54	A1778-240	DIGITEMP CONTROLLER A1	(OPTIONAL)	1
55	2500022	SOCKET BULB	(OPTIONAL)	2
56	1400115	FILTER, RED	(OPTIONAL)	2
57	1400090	LAMP LENS, GREEN		1
58	1400093	LAMP LENS, AMBER		1
59	1400092	LAMP LENS, RED		1
60	2000014	PLUG, LINE CORD P8		1
61	1500393	LINE CORD 3-12 AWG		1
62	1500077	STRAIN RELIEF		1
63	1401187	FOOT PEDAL		1
64	2634032	DELTA LOOP ELECTRONICS		1
65	1400330	COUNTER		1

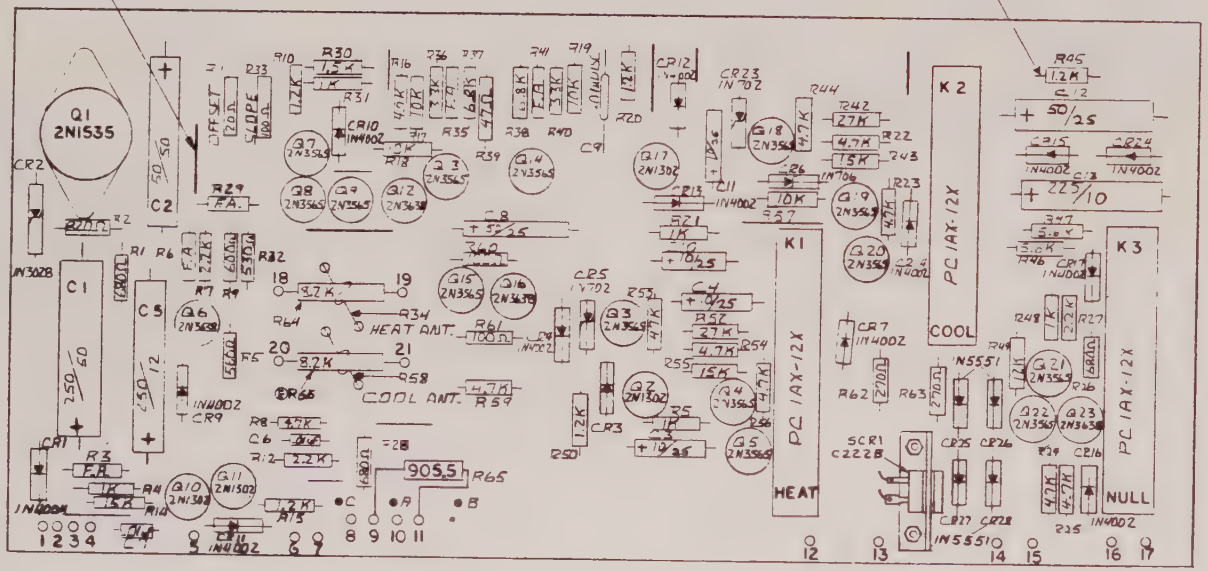
PARTS LIST (cont.)

ITEM	PART NUMBER	DESCRIPTION	QUANTITY
66	1400401	PYROMETER ASSEMBLY M1	OPTIONAL
67	1400104	RADIO INTERFERENCE FILTER	OPTIONAL
68	1631002	COVER, RFI	OPTIONAL
69	2634785	PHOTO DETECTOR BUFFER BD	REF

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPD
	A	PER ECN M-232 DATED 3-26-73 BY MORSE. ADDED NOTE 3 : R3, R35 AND R41 TO BE 1/4 W.	3-26-73 MORSE	
	B	PER ECN M308 DATED 4-20-73 BY W. AMS ADD TO NOTE 3: R29 R32 TO BE 1/4 W	4 20 73	Harris
	C	PER ECN M788. AHMED 8-2-74	8-29-74	E Brooks
	D	PER ECN M9.0 AHMED 10-10-74	10/11/74	E Brooks
	E	PER ECN M923 AHMED 10-24-74	10/27/74	K Brooks
	F	PER ECN M977 R Brooks 2-24-75 SEE ECN FOR WAS CONDITION	2/27/75	K Brooks
	G	PER ECN M1023 R Brooks 8-7-75 SEE ECN FOR WAS CONDITION	9-12-75	W Mahoney

CONNECTION POINT NO. 22 (BUS WIRE JUMPER)

ATTACH SCOPE HERE TO MONITOR NULL. CONNECT SCOPE GND TO CHASSIS GND.



⚠ RESISTORS DESIGNATED BY "F.A" ARE FACTORY ADJUST RESISTORS.

NOTES: UNLESS OTHERWISE SPECIFIED

			1/40					
			1/22					
			1/78					
			1/72					
			1/161					
			1/60					
DASH NO.	QTY	NEXT ASSY	USED ON	SERIAL NO.	DATE EFF	DWG REV	MATERIAL ⚠	
APPLICATION				EFFECTIVITY			FINISH ⚠	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
DECIMALS: XX ± .03, XXX ± .010
ANGLES 0° 30'
HOLE TOLERANCES

ENGINEERING ACTIVITY

DESIGN	T.C
DRAFTED	R. WMS 3-5-73
CHECKED	V Button
APPROV	Harris 4-7-73
RELEASE	R Brooks 3/27/73

DO NOT SCALE DWG

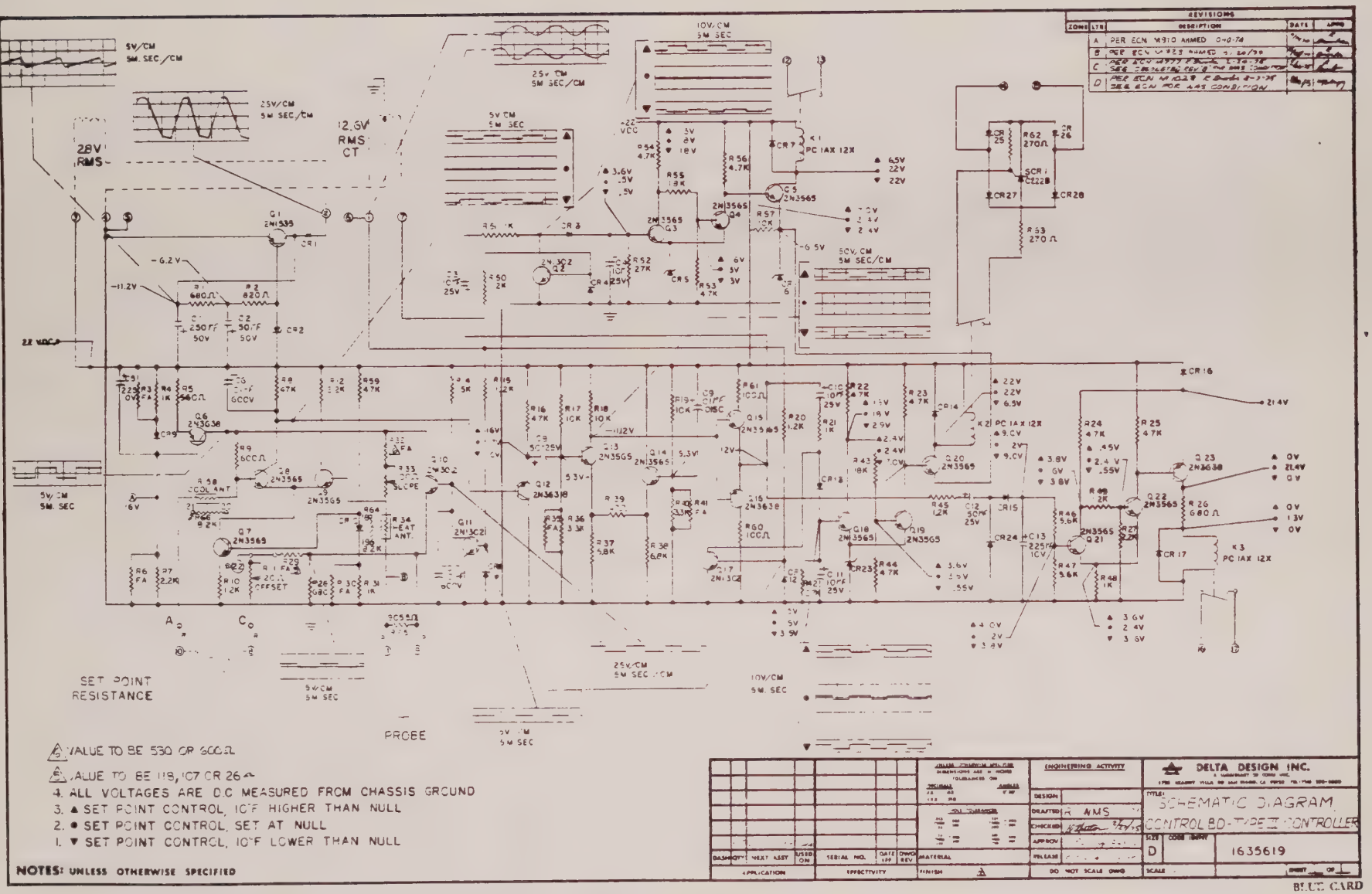
DELTA DESIGN INC.
A SUBSIDIARY OF CONRAC INC.
5725 KEARNY VILLA RD SAN DIEGO, CA. 92123 · TEL (714) 279-8000

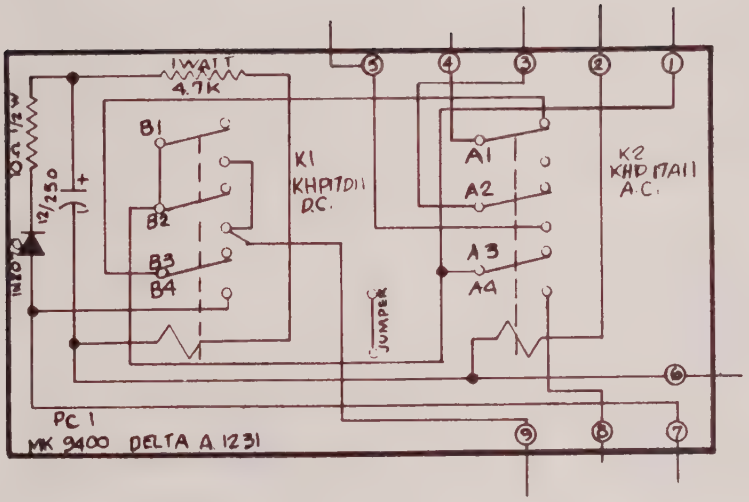
TITLE: PC ASSEMBLY TYPE III CONTROLLER

SIZE C | CODE IDENT | 2637594

SCALE NONE | SHEET 1 OF 1

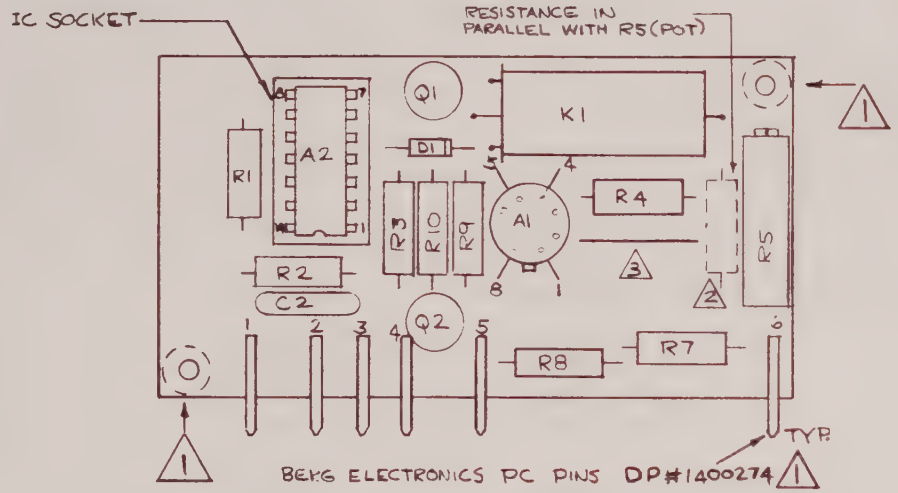
BLUE CARD


REVISIONS
ZONE LTR DESCRIPTION DATE APPD
A PER ECN 9310 ANMED 0-0-74
B PER ECN 9323 ANMED 7-26-74
C PER ECN 9777 & 9778 5-30-75
D PER ECN FOR ANS CONDITION
28V RMS
12.6V RMS CT
SET POINT RESISTANCE
PROBE
NOTES: UNLESS OTHERWISE SPECIFIED
4. ALL VOLTAGES ARE D.C MEASURED FROM CHASSIS GROUND
3. ▲ SET POINT CONTROL, 10°F HIGHER THAN NULL
2. ● SET POINT CONTROL, SET AT NULL
1. ▼ SET POINT CONTROL, 10°F LOWER THAN NULL
DELTA DESIGN INC.
SCHEMATIC DIAGRAM
CONTROL BD-TYPE II CONTROLLER
1635619
BLUE CARD



DELTAGUARD P.C. BOARD SCHEMATIC

FIGURE 23



REVISIONS				
ZONE	LTR.	DESCRIPTION	DATE	APPROVED
	A	CHANGED PC PINS TO BERG ELEC. #75055-1 LP	3/31/71	
	B	ADDED NOTE 2	4/22/71	
	C	ADDED BOURNS POT, REPLACING ELECTRO MIDLAND (R5), CHANGED LOCATION OF R11 (RSV), CHANGED DWG # TO 2G34031 (WAS 1G34031) ADDED ⚠	6/8/71	

⚠3 FOR RESISTANCE IN SERIES WITH POT (R5), REPLACE JUMPER WITH SELECTED RESISTANCE.

⚠2 FOR RESISTANCE IN PARALLEL WITH POT (R5), INSTALL RESISTOR IN POSITION SHOWN.

⚠1 FOR PLATE MOUNTING OF PC1 BOARD INSTALL 3/8 x 632 STANDOFFS 4100406. DELETE PC PINS 1400274. REDRILL HOLES 1 THRU 6 WITH #51

NOTES: DRILL & INSTALL BEEDE-CHAIN PINS 2000189

QTY. REQ'D	NOMENCLATURE OR DESCRIPTION	CODE IDENT.	IDENTIFYING NUMBER	SPECIFICATION	MATERIAL OR NOTE	ITEM NO.

NEXT ASSY	USED ON	SERIAL NOS.	DATE EFF	DWG REV. LTR.

APPLICATION — EFFECTIVITY

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON FRACTIONS DECIMALS ANGLES
± 1/64 XX ± .010 ± ½
XXX ± .005

MATERIAL:

FINISH:

	BY	DATE
DESIGN		
DRAFTED	[illegible]	1/21/71
CHECKED		
APPROV.		

PART NO.

DELTA DESIGN INC.
8000 FLETCHER PKWY.
LA MESA, CALIF 92041
TEL: A/C (714) 465-4141

TITLE: STUFFING SHEET MAXITIMER

SIZE	CODE IDENT. NO.	DRAWING NO.	REV. LTR
B		B2634031	C

SCALE 2:1 SHEET ____ OF ____

FIGURE 24

PARTS LIST

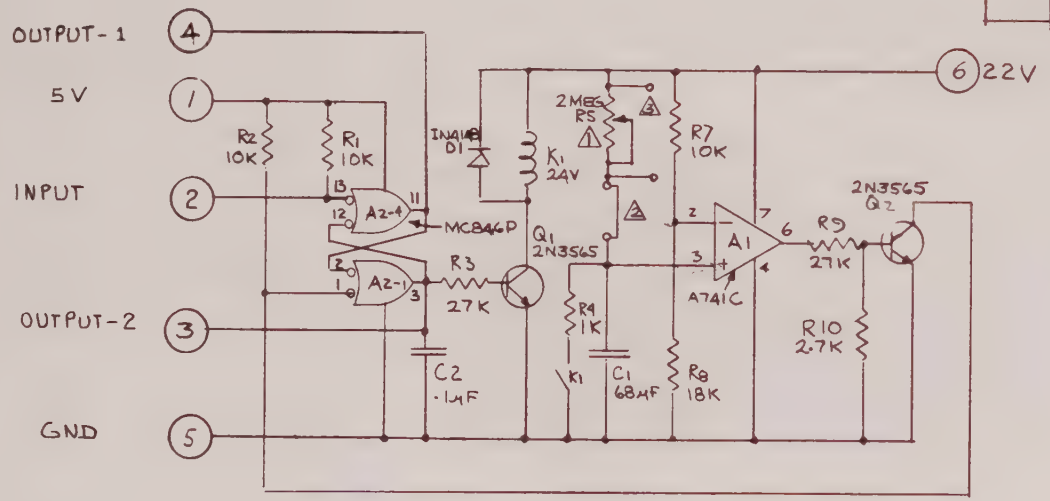
TITLE: P. C. BOARD ASSEMBLY, MAXI-TIMER (5V) REV: C

ITEM	PART NUMBER	DESCRIPTION	QUANTITY
1	1634031	SCHEMATIC MAXI-TMER	REF
2	2634031	ASSEMBLY SHEET MAXI-TIMER	REF
3	1000009	OP AMP, A1	1
4	1000010	INTGR CIRCUIT A2	1
5	1203565	TRANSISTOR, Q1, Q2	2
6	1400236	RELAY K1	1
7	0706800-020	CAPACITOR C1	1
8	0800008	CAPACITOR C2	1
9	0301030-500	RESISTOR R1, R2, R7	3
10	0302730-500	RESISTOR R3, R9	2
11	0300130-500	RESISTOR R4	1

PARTS LIST (cont.)

ITEM	PART NUMBER	DESCRIPTION	QUANTITY
12	0301230-500	RESISTOR R6	1
13	0301830-500	RESISTOR R8	1
14	0302720-500	RESISTOR R10	1
15	0500044	POTENTIOMETER R5	1
16	1400574	P. C. TERMINAL PINS	6
17	1104148	DIODE D1	1
18	4100406	3/8" x 6-32 STANDOFF PER△1 SCHEM	2
19	2000189	CONTACT PINS PER△1 SCHEM	6
20	2500051	I. C. SOCKET	1

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
	A	ADDED COMPONENT VALUES TO SCHEM	2/9/71	H.
	B	ADDED NOTE 2	6/2/71	
	C	ADDED NOTE 3, CHANGED DWG. # TO 1634031, WAS 1633165	6/7/71	JR



QTY REQ'D	NOMENCLATURE OR DESCRIPTION	CODE IDENT.	IDENTIFYING NUMBER	SPECIFICATION	MATERIAL OR NOTE	ITEM NO.

3 FOR RESISTANCE IN PARALLEL WITH POT(RS), INSTALL RESISTOR IN POSITION SHOWN ON B2634031 3

2 FOR ADDED RESISTANCE IN SERIES WITH RS, INSTALL IN PLACE OF JUMPER.

1 FOR USE WITH SUPERCHARGER CHANGE R5 TO A 200K POT. (CALLED OUT ON PARTS LIST)

NOTES:

NEXT ASSY.	USED ON	SERIAL NOS.	DATE EFF.	DWG. REV. LTR.
APPLICATION		EFFECTIVITY		

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON FRACTIONS DECIMALS ANGLES
± 1/64 .XX ±.010 ± ½
.XXX ±.005

MATERIAL:

FINISH:

	BY	DATE
DESIGN		12-14-70
DRAFTED		
CHECKED	[illegible]	12-14-70
APPROV.	CEW	12/15/70

PART NO.

DELTA DESIGN INC.
8000 FLETCHER PKWY.
LA MESA, CALIF 92041
TEL. A/C (714) 465-4141

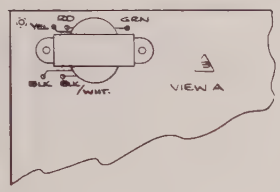
TITLE: MAXI-TIMER

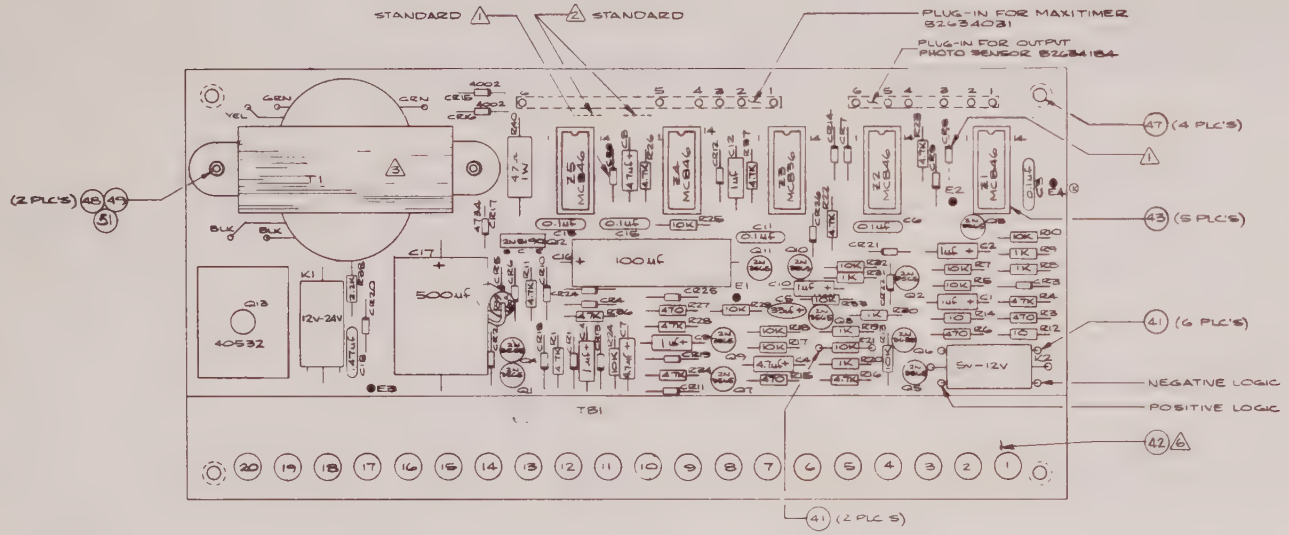
SIZE	CODE IDENT. NO.	DRAWING NO.	REV LTR
B		B1634031	C

SCALE | SHEET ____ OF ____

FIGURE 25

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPD
	H	PER ECN M490, 1-14-74, G JACKSON ESCHEMATIC ON D SIZE, C-1634073, DRWG. OBSOLETED, CHG'D DIODE NOS. FROM D TO CR, CHG'D IC NOS FROM A TO Z, ADDED NOTES 4 & 5. ALL INCAP SPACING FROM PWB	1-14-74	
	1	PER ECN M508 DTD 1-28-74 F.J.O. ADDED ITEM 50 & NOTE 6	1-28-74	
	J	PER ECN M783 F.OLEJUIK REMOVED ITEM 50 & NOTE 6 NOTE 5 WAS FOR MODEL 8885 ONLY		
	K	PER ECN M774 A MUSTAFA	7-19-74	
	L	PER ECN M1108 10-14-76 F.J.O.	10-17-76	





6. INSTALL TERMINAL STRIP (ITEM 42) ONLY AFTER INSTALLING STANDOFFS (ITEM 47)
5. ALL DIODES IN4148.
4. ALL RESISTORS 1/4W, 5%.
3. FOR BOARD HI-E OPERATION REFER TO PARTS LIST FOR T1 AND INSTALL PER VIEW A.
2. ALTERNATE POSITION FOR JUMPER. PER NOTE 4 OF SCHEMATIC C1634063
1. ALTERNATE POSITION FOR CR8 PER NOTE 3 OF SCHEMATIC C1634063.

NOTES: UNLESS OTHERWISE SPECIFIED

		ENG ITEM	5003.2				
DASH QTY	NEXT ASSY	USED ON	SERIAL NO.	DATE EFF	DWG REV	MATERIAL ⚠	
APPLICATION			EFFECTIVITY			FINISH ⚠	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
DECIMALS .XX ±.01 .XXX ±.005
ANGLES ±1°
SURFACE FINISH 63
SOLDER RESISTANCE
.062 THRU .093 ±.005
.125 THRU .250 ±.005
.312 THRU .500 ±.005
.562 THRU 1.000 ±.005

ENGINEERING ACTIVITY		
DESIGN	Jackson	11-74
DRAFTED	Jackson	11-11-74
CHECKED		11-74
APPROV		11-5-74
RELEASE		
DO NOT SCALE DWG		

DELTA DESIGN INC.
A SUBSIDIARY OF CONN INC.
SAN DIEGO, CA. 92123

TITLE: PRINTED CIRCUIT BD ASSY DELTALOOP

SIZE	CODE IDENT		
D		2634032	L
SCALE 2:1		SHEET 1 OF 1	

BLUE CARD

ORM 4-17-72

DELTA DESIGN, INC.
5725 KEARNY VILLA RD
SAN DIEGO, CA. 92123
TEL. (714) 292-5000

NOTES:

ITEM	QTY	DRAWING NUMBER	DESCRIPTION	MANUFACT AND NO.	STK OR PART NO.	FAB CODE
00	REF	D2634032	P.C. BOARD ASSY, DELTALOOP	DELTA DESIGN	2634032	
00	REF	D1634063	P.C. BOARD SCH. DELTALOOP	DELTA DESIGN	1634063	
00	REF	C1634027	P.C. BOARD ART, DELTALOOP	DELTA DESIGN	1634027	
00	REF	C1634128	P.C. BOARD BLK DIA. DELTALOOP	DELTA DESIGN	1634128	
01	1	D1634028	P.C. BOARD DRILL, DELTALOOP	DELTA DESIGN	1634028	
02	4		INTEGRATED CKT, Z1,Z2,Z4,Z5	MOTOROLA MC846P	1000010	70
03	1		INTEGRATED CKT, Z3	MOTOROLA MC836P	1000011	70
04						
05						
06	10		TRANSISTOR, Q1-Q5, Q7-Q11	FAIRCHILD 2N3565	1203565	70
07	1		TRANSISTOR, Q6	MOTOROLA 2N3638	1203638	70
08	1		TRANSISTOR, Q12	MOTOROLA 2N5190	1205190	70
09	1		TRIAC, Q13	RCA 40532	1201541	70
10						
11						
12	22		DIODE, CR1-CR14,CR18,CR19,CR20-CR22,CR24 FAIRCHILD 1N4148		1104148	70
			CR25,CR26			
13	2		DIODE, CR15,CR16	MOTOROLA 1N4002	1104002	70
14	1		DIODE, ZENER, CR17	DICKSON 1N4734A	1104734	70
15						
16						
17	11		RESISTOR, 4.7K,1/4W,5% R1,R4,R11,R16	ECN X264-11-5-74	4010025-472	70
			R22,R23,R26,R28,R34.R36,R37,			
18	4		RESISTOR,470,1/4W,5% R3,R6,R15,R27		4010025-471	70

REVISIONS

REV	DATE	BY	APPD	DESCRIPTION
K	10-14-6	FJO		PER ECN1108
G	1-28-74	FJO		PER ECN M508 DTD 1-26-74 ADDED ITEM 56
H	6-19-74	CLEJNIK		PER ECN M703 REMOVED ITEM 50
J	8/22/74	A HUTTON		PER ECN M774 ADDED EQ, CHG. RAC TO 475-1W

TITLE: P.C. BOARD ASSY DELTALOOP

BY	JACKSON	1-10-74
CHK		
APPD	Harris	1-15-74

NEXT ASSY P/L: END ITEM

P/L 2634032 REV K SHT 1 OF 3

DELTA DESIGN, INC.

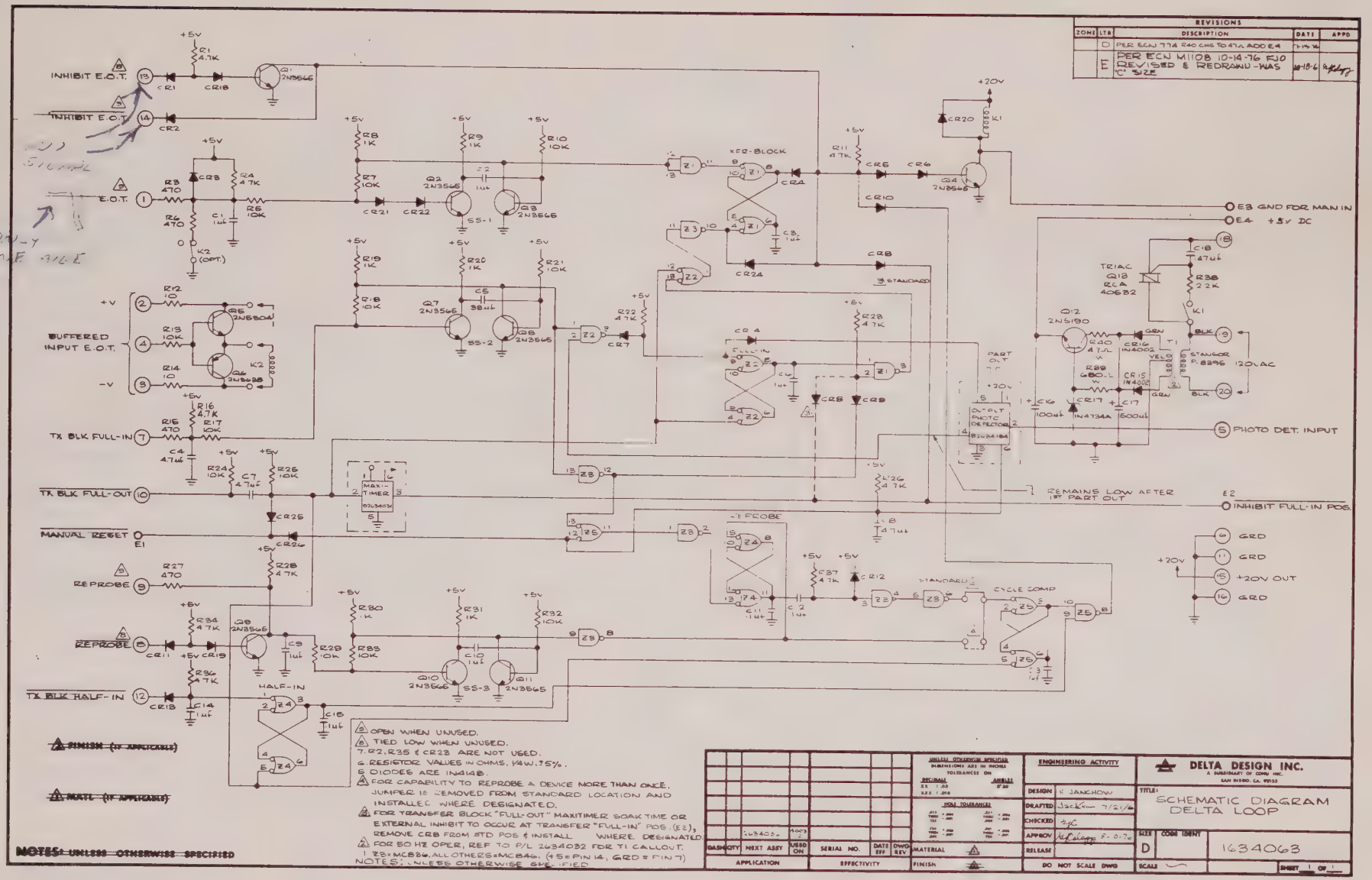
Parts List No. 2634032

Sheet 2 of 3

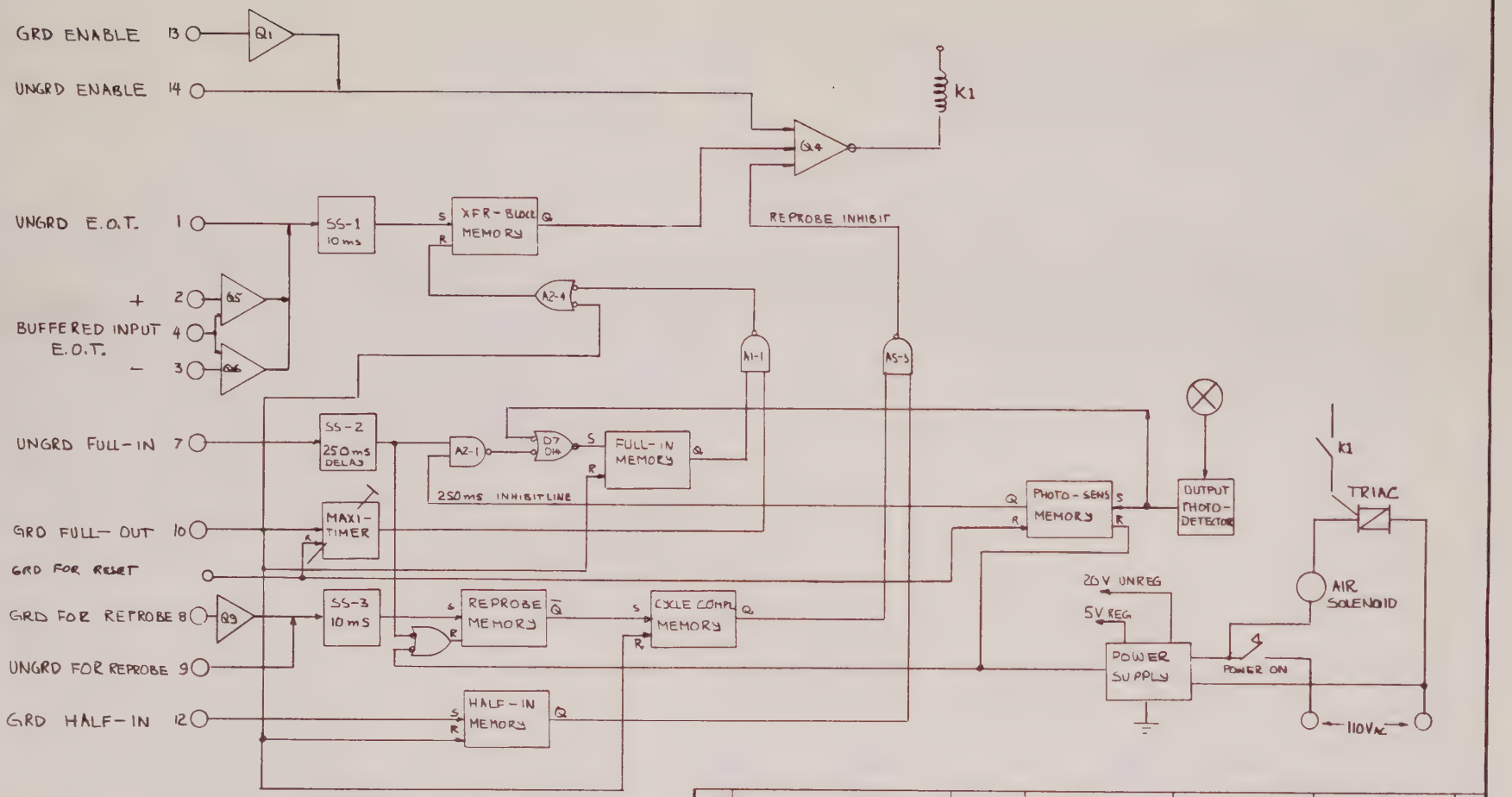
Item	Qty.	Drawing Number		Description	Manufacturer and Part No.	Stock No.	Fab. Code
19	12			RESISTOR, 10K,1/4W,5%,R5,R7,R10, R13,R17,R18,R21,R24,R25,R29,R32,R33		0301034-500	70
20	6			RESISTOR, 1K,1/4W,5%,R8,R9,R19 R20,R30,R31		4045000-102	70
21	2			RESISTOR, 10,1/4W,5% R12,R14		4045000-100	70
22	1			RESISTOR, 2.2K,1/4W,5%,R38		4045000-222	
23	1			RESISTOR,47Ω, 1W, 5%, R40		0310031-470	70
24	1			RESISTOR, 680Ω, 1 WATT, R39			
25							
26	6			CAPACITOR,1uf@34VDC,C1,C2,C9,C10 C12,C14	SPRAGUE 196D 105x0035HA1	0700100035	70
27	5			CAPACITOR, 0.1uf@100VDC,C3,C6,C11 C13,C15	SPRAGUE 225P10491	0800008	70
28	3			CAPACITOR,4.7uf@10VDC,C4,C7,C8	SPRAGUE 196D 475x0010HA1	0704710010	70
29	1			CAPACITOR, 33uf @10VCD,C5	SPRAGUE 196D-336x0010KA1	0703300010	70
30	1			CAPACITOR,100uf @50VDC, C16	SPRAGUE	0710000050	70
31	1			CAPACITOR,500uf @ 25VDC,C17	SPRAGUE 39D 5076025HE4	0750000025	70
32	1			CAPACITOR, .47uf, C18		0800006	70
33							
34							
35	1			RELAY, 12V TO 24V, K1	PHIPPS OF-1A-12	1400236	70
36	1			RELAY, 5V TO 12V, K2	PHIPPS OF-1A-6	1400237	70
				RELAY, 12V TO 24V, CUST.ORDER	PHIPPS OF-1A-12	1400236	
				RELAY, 24V TO 48V, CUST.ORDER	PHIPPS OF-1A-24	1400234	
37							
38							
39	1			TRANSFORMER, T1	STANCOR P-8395	1400268	70
40	1		*	TRANSFORMER, T1	TRIAD F90X OR STANCOR	1400296	70
			*	USE FOR 50 HZ REQ. OR ALTERNATE FOR STANCOR DP#1400268 (STD UNIT)			
				REFER TO C1634032 FOR INSTALLATION INSTRUCTIONS			

DELTA DESIGN, INC. | Parts List No. 2634032 | Sheet 3 of 3

Item	Qty	Drawing Number	Description	Manufacturer and Part No.	Stock No.	Fab. Code
41	8		PIN SOCKET FOR K2 & R21	ROBINSON NUGENT PS-301-14	2500023	70
42	1		TERMINAL STRIP	CINCH JONES 20-164Y/600Y-20	1400417	70
43	5		I.C. SOCKET, 14 PIN DIP	CINCH JONES	2500051	70
44	4		P.C. PINS E1-E4	BEEDE-CHAIN	2000189	70
45						
46						
47	4		3/8" STANDOFF	CAMBION	4100097	70
48	2		#6-32 x 3/8 RD HD SCR SST		6806323800	90
49	2		#6-32 HEX NUT		6706320	90
50						
51	2		#6 SPLIT LOCK WASHER			


REVISIONS
ZONE | LTR | DESCRIPTION | DATE | APPD
D | PER ECN 774 R40 CHG TO 47K ADD E4
E | PER ECN M1108 10-16-76 EJO REVISED & REDRAWD - WAS "C" SIZE
INHIBIT E.O.T.
INHIBIT E.O.T.
E.O.T.
BUFFERED INPUT E.O.T.
TX BLK FULL-IN
TX BLK FULL-OUT
MANUAL RESET
REPROBE
REPROBE
TX BLK HALF-IN
XFR-BLOCK
STANDARD
TRIAC Q13 RCA 40682
Q12 2N5190
STANGOR P-8896 120VAC
0° VOLT PHOTO DETECTOR
PART OUT
REMAINS LOW AFTER 1ST PART OUT
CYCLE COMP
E3 GND FOR MAN IN
E4 +5V DC
PHOTO DET. INPUT
E2
INHIBIT FULL-IN POS.
GRD
GRD
+20V OUT
GRD
OPEN WHEN UNUSED.
TIED LOW WHEN UNUSED.
7. R22, R35 & CR23 ARE NOT USED.
6. RESISTOR VALUES IN OHMS, 1/4W, 5%.
5. DIODES ARE IN4148.
4. FOR CAPABILITY TO REPROBE A DEVICE MORE THAN ONCE, JUMPER IS REMOVED FROM STANDARD LOCATION AND INSTALLED WHERE DESIGNATED.
3. FOR TRANSFER BLOCK "FULL-OUT" MAXITIMER SOAK TIME OR EXTERNAL INHIBIT TO OCCUR AT TRANSFER "FULL-IN" POS. (E2), REMOVE CR8 FROM STD POS & INSTALL WHERE DESIGNATED.
2. FOR 50 HZ OPER, REF TO P/L 2634032 FOR TI CALLOUT.
1. Z8=MC836, ALL OTHERS=MC846. (+5=PIN 14, GRD=PIN 7)
NOTES: UNLESS OTHERWISE SPECIFIED
ENGINEERING ACTIVITY
DESIGN N. JANCHOW
DRAFTED Jackson 7/21/76
CHECKED
APPROV
RELEASE
DO NOT SCALE DWG
DELTA DESIGN INC.
A SUBSIDIARY OF CONN, INC.
SAN DIEGO, CA. 92123
TITLE: SCHEMATIC DIAGRAM DELTA LOOP
SIZE D
CODE IDENT
1634063
SCALE
SHEET 1 OF 1
QUANTITY | NEXT ASSY | USED ON | SERIAL NO. | DATE EFF | DWG REV | MATERIAL
APPLICATION | EFFECTIVITY | FINISH
BLUE CARD

ZONE	LTR	DESCRIPTION	DATE	APPROVED
	A	ADDED MANUAL RESET	4/14/71	JR



QTY REQ'D	NOMENCLATURE OR DESCRIPTION	CODE IDENT	IDENTIFYING NUMBER	SPECIFICATION	MATERIAL OR NOTE	ITEM NO

NEXT ASSY.	USED ON	SERIAL NOS	DATE EFF	DWG. REV LTR.
APPLICATION		EFFECTIVITY		

UNLESS OTHERWISE SPECIFIED THE FOLLOWING APPLIES
BREAK ALL SHARP EDGES .005
MAX. SURFACE ROUGHNESS 125 RMS
THDS INT CL 2B EXT CL 2A
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± 1/64 ANGLES ± ½°
DECIMALS XX ± .010
XXX ± .005

MATERIAL

FINISH:

	BY	DATE
DESIGN	Hardwick	3/24/71
DRAFTED	—	3/24/71
CHECKED	Hardwick	3/24/71
APPROV		

DO NOT SCALE DRAWING

PART NO

DELTA DESIGN INC.
8000 FLETCHER PKWY
LA MESA CALIF 92041
TEL A/C (714) 465 4141

TITLE: BLOCK - DIAGRAM DELTA - LOOP

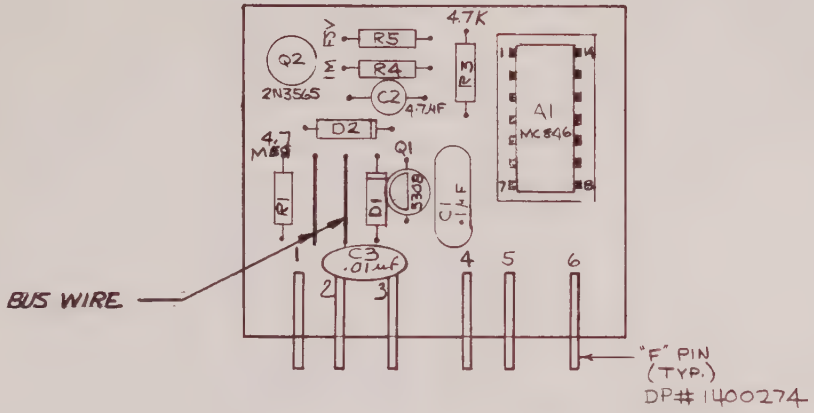
SIZE	CODE IDENT NO.	DRAWING NO	REV LTR
C		C1634128	A

SCALE | SHEET 1 OF 1

NOTES:

FIGURE 28

REVISIONS				
ZONE	LTR.	DESCRIPTION	DATE	APPROVED
	A	ADDED Q2, C2, R4, R5, D1, D2, D3	6/1/71	
	B	PER ECN M991 4-16-75 CLEANUP	4-18-5	



QTY REQ'D	NOMENCLATURE OR DESCRIPTION	CODE IDENT.	IDENTIFYING NUMBER	SPECIFICATION	MATERIAL OR NOTE	ITEM NO

NOTES:

NEXT ASSY.	USED ON	SERIAL NOS.	DATE EFF.	DWG REV. LTR.
APPLICATION		EFFECTIVITY		

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON FRACTIONS DECIMALS ANGLES
± 1/64 .XX ±.010 ± ½
.XXX ±.005

MATERIAL

FINISH

	BY	DATE
DESIGN		
DRAFTED	[illegible]	3/31/71
CHECKED	[illegible]	
APPROV.	[illegible]	3/31/71

PART NO.

DELTA DESIGN INC.
8000 FLETCHER PKWY.
LA MESA, CALIF. 92041
TEL: A/C (714) 465-4141

TITLE: ASSEMBLY SHEET, OUTPUT SENSOR

SIZE	CODE IDENT. NO.	DRAWING NO.	REV. LTR
B		B2634184	B

SCALE

SHEET ____ OF ____

BLUE CARD

DELTA DESIGN, INC.
8000 FLETCHER PKWY.
LA MESA, CALIF. 92041
TEL. (714) 465-4141

	By	Date
Drafted	[illegible]	3/31/71
Pilot Run App'd.		
Production App'd.		

Next Ass'y. Parts List

Parts List P2634184 | Rev. A | Sheet 1 of 1

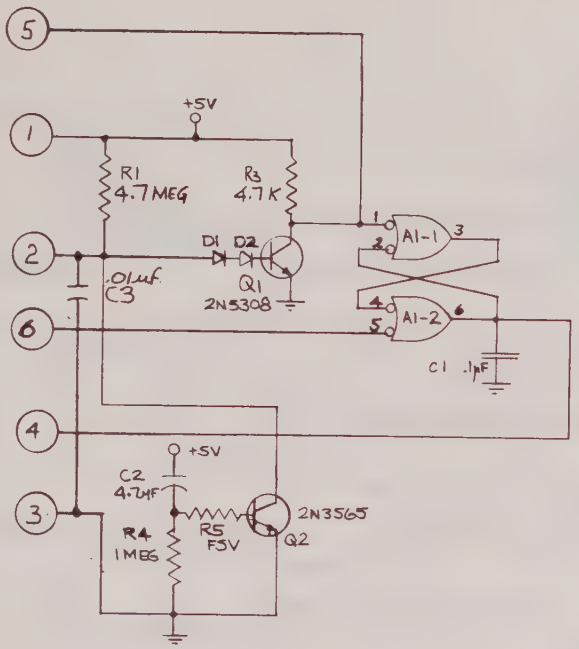
Description:
P. C. BOARD ASSEMBLY, OUTPUT-SENSOR

Item	Qty.	Drawing Number	Description	Manufacturer and Part No.	Stock No	Fab. Code
00		* B1634184	SCHEMATIC——"OUTPUT SENSOR"			
01	1		INTEGRATED CIRCUIT A1	MOTOROLA MC846P	1000010	
02	1		RESISTOR R1	4.7 MEG. 5% 1/4W	4045000-475	
~~03~~	~~1~~		~~RESISTOR R2~~	~~470K 5% 1/4W~~	~~0347034-500~~	
04	1		RESISTOR R3	4.7K 5% 1/4W	4045000-472	
05	1		TRANSISTOR Q1	2N5308	1205308	
06	1		CAPACITOR C1 .1uF/100V	SPRAGUE	0800008	
07	1	B1634149	P.C. BOARD	DELTA B1634149 A	1300089	
08	1		I.C. SOCKET	CINCH-JONES	2500051	
09	6		"F" P.C. PINS #75055-1 LP	BERG ELECTRONICS	1400574	
10	1		RESISTOR R4	1 MEGΩ 1/4W 5%	0300164-500	
11	1		RESISTOR R5	FACTORY SEL. VALUE		
12	2		DIODE D1, D2	FAIRCHILD IN4148	1104143	
13	1		CAPACITOR C2 4.7μF/10V	SPRAGUE 196D-475X0010HA1	0704710010	
14	1		TRANSISTOR Q2	FAIRCHILD 2N3565	1203565	
15	1		CAPACITOR C3 .01μf 100V		0410008-103	

Rev.	Date	App'd	Revision Description
A	6/1/71	[illegible]	ADDED Q2, C2, R4, R5, D1, D2, D3, CHANGED PL # TO P2634184
B	4-16-5	F.J.O.	PER ECN M991 [illegible] 4-17-5

* ASSEMBLY SHEET B1634184
DRILL INSTRUCT. B1634183
ARTWK. B1634149

REVISIONS				
ZONE	LTR.	DESCRIPTION	DATE	APPROVED
	A	ADDED Q2, C2, R4, R5, D1, D2, D3, CHANGED DWG# TO B1634184 ECO # 780 S/N 4-20-5, 4-20-6	6/1/71	
	B	PER ECN M991 4-16-75 F. OLEJNIK	4-18-5	



QTY REQ'D	NOMENCLATURE OR DESCRIPTION	CODE IDENT.	IDENTIFYING NUMBER	SPECIFICATION	MATERIAL OR NOTE	ITEM NO

NOTES:

NEXT ASSY.	USED ON	SERIAL NOS.	DATE EFF.	DWG REV LTR

APPLICATION | EFFECTIVITY

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON FRACTIONS DECIMALS ANGLES
± 1/64 .XX ±.010 ± ½°
.XXX ±.005

MATERIAL:

FINISH:

	BY	DATE
DESIGN	Hardners	3/4/71
DRAFTED	"	"
CHECKED	Hardners	3/4/71
APPROV.	Hardners	4/1/71

PART NO.

DELTA DESIGN INC.
8000 FLETCHER PKWY.
LA MESA, CALIF. 92041
TEL: A/C (714) 465-4141

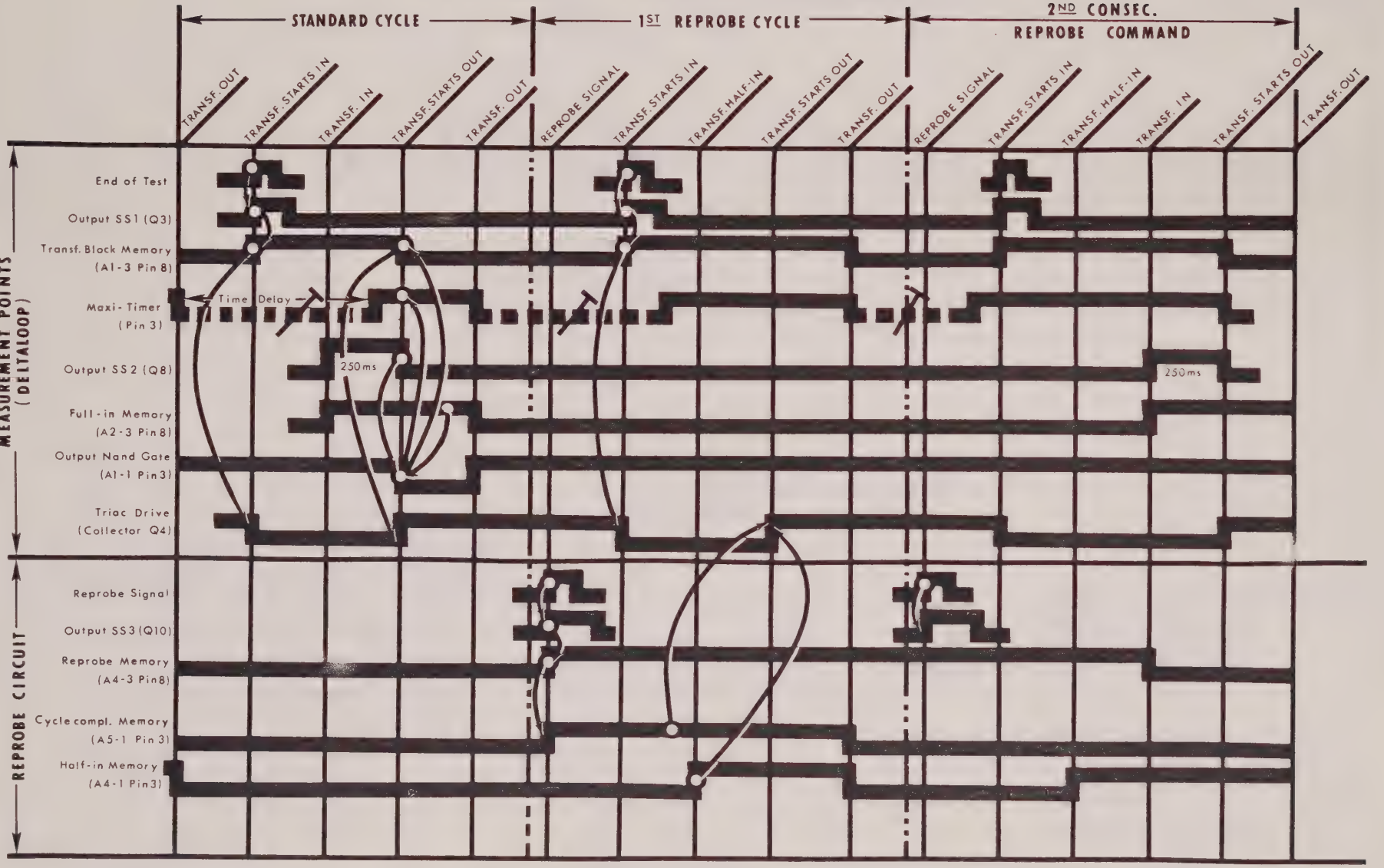
TITLE: SCHEMATIC OUTPUT-SENSOR

SIZE	CODE IDENT. NO.	DRAWING NO.	REV LTR
B		B 1634184	B

SCALE | SHEET ___ OF ___

BLUE CARD

SIGNAL PHASE RELATIONSHIP - DELTALOOP TO AUTOMATIC HANDLING EQUIPMENT



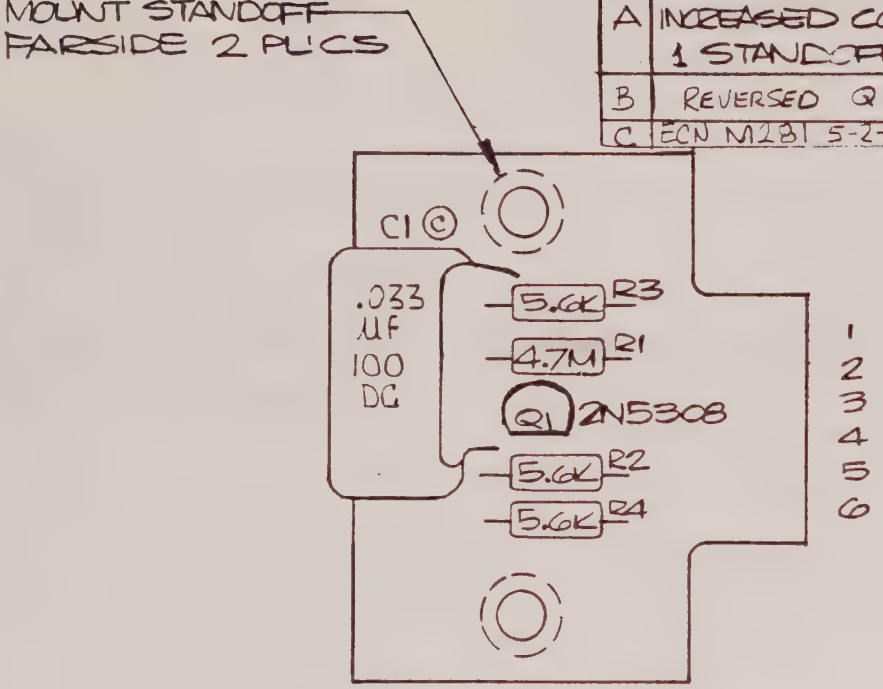
Note: (1) Arrows show sequence of signals

(2) Signals are related in time and level (high or low) only.

FIGURE 31

030871

REVISIONS			
LTR.	DESCRIPTION	DATE	APPROVED
A	INCREASED CONN BD SIZE ADDED 1 STANDOFF	8-6-71	L. ELLIS
B	REVERSED Q1	9-10-71	L. ELLIS
C	ECN M181 5-2-73 ADDED C1 FRANKO	5-2-73	L. ELLIS



ALL RESISTORS ARE 1/4W, 5% CARBON.

DRILL DWG A1638377

SERIAL NOS.	DATE EFF.	DWG. REV. LTR.

EFFECTIVITY

NEXT ASSY. | USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED THE FOLLOWING APPLIES:
BREAK ALL SHARP EDGES .005 MAX., SURFACE ROUGHNESS 125 RMS THDS. INT. CL. 2B, EXT. CL. 2A

DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± 1/64 ANGLES ± ½°
DECIMALS .XX ±.010
.XXX ±.005

MATERIAL:

FINISH:

	BY	DATE
DESIGN	MGE	8-6-71
DRAFTED	MGE	8-6-71
CHECKED	MGE	8-6-71
APPROV.	L. ELLIS	

DO NOT SCALE DRAWING

PART NO. 1634785

DELTA DESIGN INC.
8000 FLETCHER PKWY.
LA MESA, CALIF. 92041
TEL: A/C (714) 465-4141

TITLE:
: CIRCUIT CARD ASSY-PHOTO
: DETECTOR BUFFER BOARD

SIZE	CODE IDENT. NO.	DRAWING NO.	REV. LTR.
A		A2634785	C

SCALE 2:1 SHEET 1 OF 1

BLUE CARD

DELTA DESIGN, INC.
8000 FLETCHER PKWY.
LA MESA CALIF. 92041
TEL. (714) 465-4141

	By	Date
Drafted	MGE	8-6-71
Pilot Run App'd.	MGE	8-6-73
Production App'd.	LELLS	

Next Assy Parts List

Parts List: P2634785 | Rev. C | Sheet 1 of 1

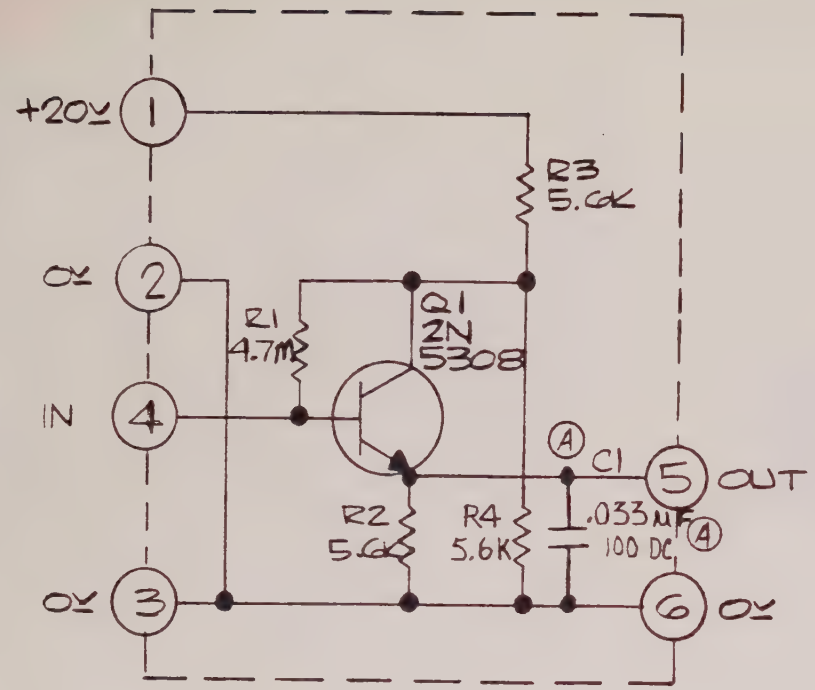
Description: CIRCUIT CARD ASS'Y PHOTODETECTOR BUFFER BD.

Item	Qty.	Drawing Number	Description	Manufacturer and Part No	Stock No	Fab Code
	REF	A2634785	CIRCUIT CARD ASS'Y			17
1	REF	A1634783	SCHEMATIC			
2	REF	A1634784	CIRCUIT CARD PHOTO DET. BUFFER BD. ARTWORK		1634784	
3	1		TRANSISTOR Q1	2N5308 G.E.	1205308	70
4	3		RESISTOR R2,3,4 5.6K Ω 1/4 5%		0305624-500	70
5	1		RESISTOR R1 4.7MΩ 1/4 5%		4045000-475	70
6	2		STAND-OFF		4100096	70
7	1		CAPACITOR .033 MF 100 DC		0800004	70
8	1	A1638377	PRINTED CIRCUIT BD DET. BUFFER		1638377	12

Rev.	Date	Appd.	Revision Description
C	5-2-73	LELLS	ADDED ITEM 7 PER ECN M281
D	7-13-73		ADDED ITEM 8 PER ECN M312

REVISIONS

LTR.	DESCRIPTION	DATE	APPROVED
A	PER ECN M DTD. 5-2-73 F. OLEJNIK ADDED C1	5-2-73	L. ELLIS



NOTE:

1. ALL RESISTORS ARE Y4W, 5% CARBON.

SERIAL NOS.	DATE EFF.	DWG. REV. LTR.

EFFECTIVITY

NEXT ASSY. | USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED THE FOLLOWING APPLIES:
BREAK ALL SHARP EDGES .005 MAX., SURFACE ROUGHNESS 125 RMS
THDS. INT. CL. 2B, EXT. CL. 2A
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± 1/64 ANGLES ± ½°
DECIMALS .XX ±.010
.XXX ±.005

MATERIAL:

FINISH:

	BY	DATE
DESIGN		
DRAFTED	MGE	7-26-71
CHECKED	ABOVE	8-2-71
APPROV.	L. ELLIS	8-2-71

DO NOT SCALE DRAWING

PART NO.

DELTA DESIGN INC.
8000 FLETCHER PKWY.
LA MESA, CALIF. 92041
TEL: A/C (714) 465-4141

TITLE:
: SCHEMATIC - PHOTO
: DETECTOR BUFFER BD.

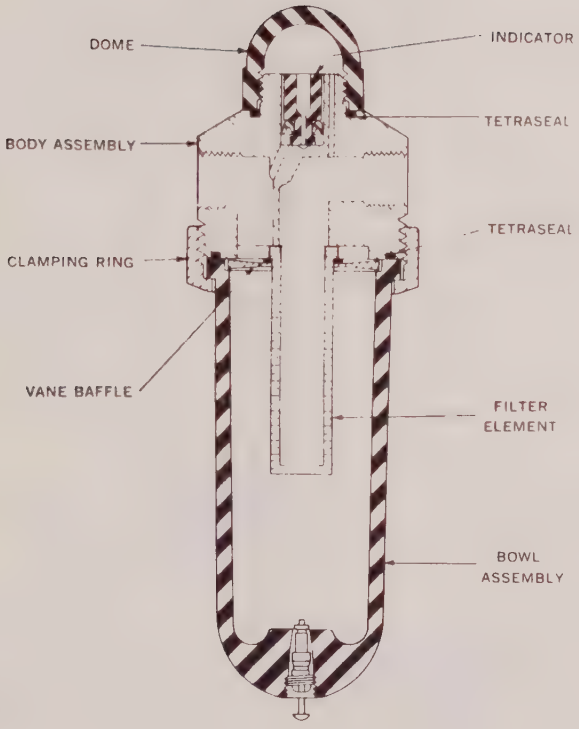
SIZE	CODE IDENT. NO.	DRAWING NO.	REV. LTR.
A		1634783	A

SCALE NONE

SHEET 1 OF 1

BLUEBOARD

MINI AIR LINE FILTERS



OPERATION

1. Solids and free moisture are automatically removed by the Mini-Filter.
2. Accumulated moisture must be drained whenever it fills the reservoir bowl to the level of the filter element. To drain the bowl, push up on the petcock stem.
3. When the filter element requires cleaning, the visual filtergard indicator will look "yellow." Once the indicator has popped up, it will remain up regardless of air flow or pressure change.

OPERATING RANGES

WORKING PRESSURE.....150 psi maximum
TEMPERATURE RANGE.....+10°F. to +125°F.

INSTALLATION

Filters must be installed with air flow in the direction indicated on the body. When used with a regulator and/or lubricator, the filter should be installed upstream from these units. Filters should always be installed as far as possible downstream towards the point of air use. Mini-Filters must be installed with the transparent bowl hanging down so that trapped moisture will collect in the bottom of the bowl.

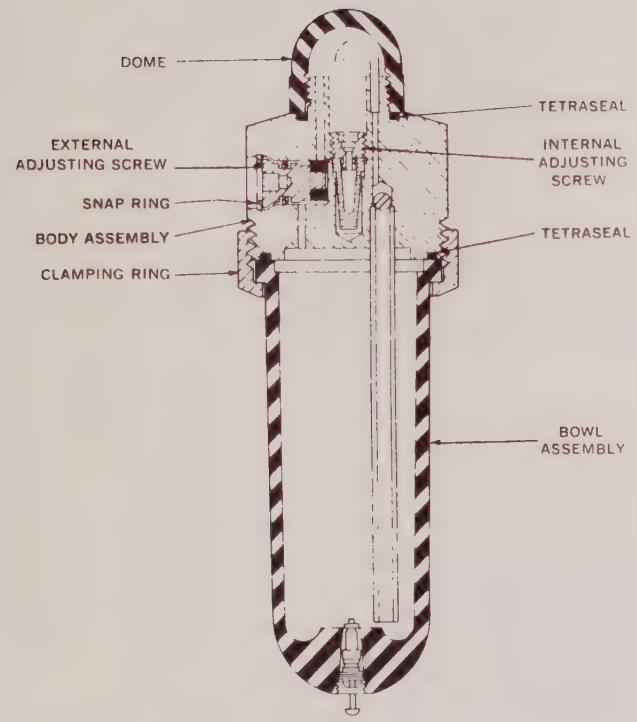
NOTE: Due to rough handling in transit, the visual filtergard indicator may look "yellow" when the filter is received. It must be reset before the filter can be placed in service. Unscrew the dome, reset the indicator, and replace the dome.

CLEANING

CAUTION: Do not attempt to remove bowl under pressure.

1. Shut off the air supply and depress the petcock stem to bleed down residual pressure.
2. Unscrew and remove the clamping ring.
3. Remove and invert the bowl assembly. The filter element will drop out of the bowl assembly.
4. Wash the filter element and bowl in kerosene, white gasoline, or soap water. **Gasoline with additives, or any fluid or solvent containing acetone, ethylacetate, ethylene dichloride, toluene, etc., must not be used or bowl will be damaged.**
5. Dry the filter element by blowing compressed air from the inside outward after washing.
6. Unscrew the dome and manually reset the yellow indicator.
7. Reassemble the unit.

MINI AIR LINE LUBRICATORS



OPERATION

1. **IMPORTANT: Use only those oils recommended by the supplier as suitable for pneumatic-hydraulic service. Oils with adhesive-type additives should not be used.** Use oil with a viscosity of 80 to 150 SSU at 100°F. Compounded oils, including automotive oils, containing detergents or other additives such as solvents, soaps or graphite are not recommended.
2. To fill the oil reservoir bowl:
   a) Shut off the air supply and bleed down line pressure.
   b) Unscrew and remove the clamping ring.
   c) Remove the bowl and fill with oil (See #1, above).
   d) Replace the bowl and clamping ring and turn on air supply.
3. Operate the air equipment to be lubricated and observe the oil delivery rate in the oil feed indicator dome. The rate of oil feed shown in the dome is 100% of the oil that is being injected into the air stream in mist form.
4. The oil delivery rate has been factory pre-set to provide proper lubrication for most operating conditions. It may be adjusted within normal operating ranges by turning the external adjustment. For extreme air flow rates (less than .5 CFM or extremely high flow) it is necessary to adjust the oil delivery rate internally. To do this:
   a) Shut off the air supply and bleed down line pressure.
   b) Unscrew and remove the dome.
   c) Using a 3/32" allen wrench, turn the internal adjusting screw clockwise to increase the delivery rate or counter clockwise to decrease the rate.
   d) Replace the dome and turn on line pressure.

OPERATING RANGES

WORKING PRESSURE.....150 psi maximum
TEMPERATURE RANGE.....+10°F. to +125°F.

INSTALLATION

1. To assure dependable lubrication, a Mini-Filter should be installed upstream from the lubricator.
2. Lubricators must be installed with air flow in the direction indicated on the body. When used with a filter and/or regulator, the lubricator should be installed downstream from these units. Lubricators should be installed as close as possible to the device to be lubricated. Avoid installations that require the air-oil mixture to move upward from the lubricator to the device to be lubricated.
3. To assure proper lubrication, install a separate lubricator for each air operated device.
4. Mini-Lubricators are designed for operation under the air flow rate normal for the port size of each unit. Subnormal air flows may result from use of speed control valves, in which case the lubricator size should be selected according to **anticipated air flow rates** rather than the port size of the devices to be served.

CLEANING

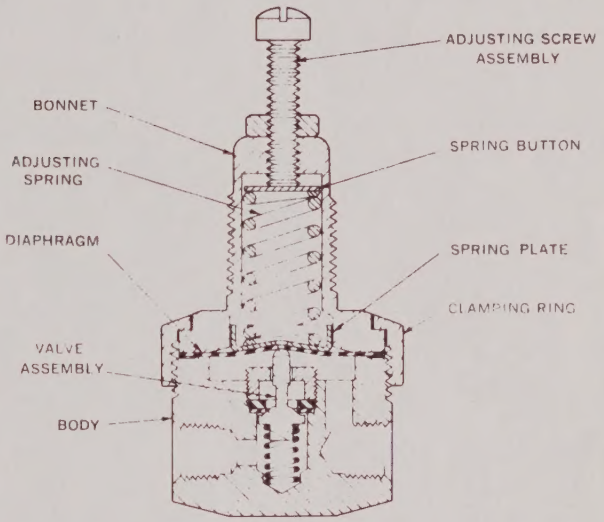
CAUTION: Do not attempt to disassemble unit while line is under pressure.

1. Shut off the air supply and bleed down line pressure.
2. Unscrew and remove the clamping ring.
3. Remove and wash the bowl in kerosene, white gasoline or soap water. **Gasoline with additives or any fluid or solvent containing acetone, ethyl acetate, ethylene dichloride, toluene, etc., must not be used or bowl will be damaged.**
4. Unscrew and remove the dome; unscrew and remove the internal oil adjusting screw.
5. Wash the screw assembly and blow off the sintered element with compressed air.
6. Wash the body assembly, and blow out the air and oil passages with compressed air.
7. Replace the internal adjusting screw and replace the dome.
8. Fill the bowl with oil as described under step #2 of OPERATION instructions.

MINI AIR LINE REGULATORS

OPERATING RANGES

PRIMARY PRESSURE.....250 psi maximum
DELIVERY PRESSURE..... .....5-125 psi
TEMPERATURE RANGE.....+10°F. to +165°F.



INSTALLATION

1. To assure dependable operation, a Mini-Filter should be used with the regulator to guard against contamination from foreign matter.
2. Regulators must be installed with air flow in the direction indicated on the body. When used with a filter and/or lubricator, the regulator should be installed between these units with the filter on the upstream side and the lubricator on the downstream side. Regulators should always be installed as far as possible downstream towards the point of air use.
   Mini-Regulators may be installed in any position for convenient adjusting screw operation with no loss in operating characteristics.

SERVICING

CAUTION: Do not attempt to disassemble regulator while line is under pressure.

If regulator requires servicing, it can be completely disassembled while still installed in the air line.

PRESSURE ADJUSTMENT

Regulator adjustment must be made with the line pressure valve open. Carefully follow these steps:

1. Turn the regulator adjusting screw counter clockwise to release compression from the adjusting spring.
2. Open the line pressure valve.
3. Adjust the operating pressure by turning the adjusting screw clockwise until the gauge indicates the desired pressure.
4. To lower the pressure setting, turn the adjusting screw counter clockwise until the gauge reading is approximately 5 psi lower than the desired delivery pressure. Then, slowly turn the adjusting screw clockwise until the desired pressure is obtained.
5. When the required pressure has been determined under normal operating conditions, the adjusting screw lock nut should be tightened to prevent tampering.

MP MASTER
MA32441